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No. 7

CONSTRUCTING PASSAIC VALLEY SEWER

Methods Employed by Contractors on Section from Bayonne to Robbins Reef Outlet—Sinking One Hundred Foot Shaft in New York Bay—Plans for Outlets.

That section (No. 2) of the Passaic valley sewer from the contract of the New York and New Jersey Construction Co., described in the issue of January 21, to the terminal chamber at Robbins reef is being built by the O'Rourke Engineering Construction Co., 17 Battery Place, N. Y. This contract comprises 15,000 feet of 12-foot concrete-lined circular tube, running about 80 feet below sea level from Bayonne to the reef. At the present time about 3,300 feet of this tunnel is "rough cut" and is now being trimmed down to the proper cross-section. The shaft at Bayonne, known as Jersey City shaft No. 2, has been sunk and work is proceeding on another shaft which is being built for construction purposes only in New York bay about 4,000 feet from the reef. Work on the terminal chamber itself will probably not begin until late in the summer.

From Jersey City shaft No. 2, the tunnel back to the 100-foot level heading of the New York and New Jersey Construction Co. has been driven back 1,675 feet—as far as is embraced in this contract. In the other direction, that is, toward New York bay, the tube has been driven about 1,370 feet. At this point the rock ran out and mud and gravel were encountered, necessitating the temporary abandonment of the work at this point. At present, work is still at a standstill, and there is a likelihood that it will be necessary to use compressed air for the remainder of the tunnel to the reef. Borings are now being made to further determine the nature of the ground before proceeding with the work.

Eight thousand feet farther on toward the reef, is the construction shaft which is being sunk in the bay. This will be filled up when the work is completed and the bottom of the bay restored to its original condition. No. 2 shaft, however, will be lined with concrete and will serve as a means of communication with the sewer. It will be twelve feet in internal diameter, after it has been lined with $2\frac{1}{2}$ feet of concrete. The internal diameter of 17 feet in the rough was necessary for construction purposes. The first fifty feet of this shaft is through earth and the lining in this section will be reinforced with

$\frac{3}{4}$ -inch square twisted steel rods, placed both horizontally and vertically. The bottom of the shaft (where it intersects the pressure tunnel) will be filled for 15 feet above the tunnel with solid concrete, in the center of which will be placed a five-foot manhole. This will be secured against upward pressure by six $\frac{3}{4}$ -inch bolts, each eight feet long and set in the concrete. A pressure cover will be provided for the manhole.

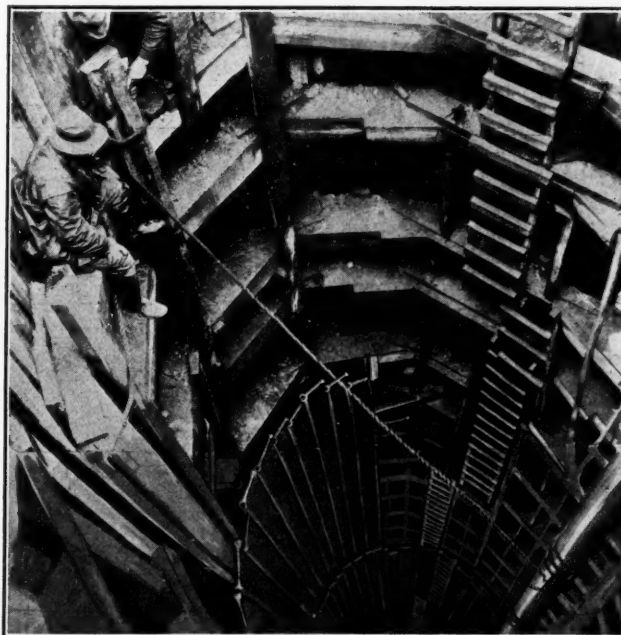
Wrought iron steps will afford a means of entrance to the bottom of the shaft and the manhole will allow entrance to the sewer when it is drained. This manhole will be the only entrance between the Newark shaft and the terminal chamber. Two inspection manholes are provided at the terminal and a small shaft about 3 feet in diameter is sunk along side the Newark shaft.

The methods of construction used by this company are,

in general, the same as those used on other parts of the work, though differing somewhat in detail. Owing to the entirely different conditions in the shaft, variations in the timbering had to be used. On the No. 2 shaft, the first fifty feet were through earth and the timbering here was built of 12 by 12 timbers, set in horizontally in the form of a square and braced at the corners with other 12 by 12 beams. Inside of these were set vertically four more timbers of the same size, which acted as the frame for the cage shaft. Guide supports were of 10 by 10 timbers and the guides were of 6-inch material. The breast pieces were braced at every five feet of vertical distance. Two-inch planking was used as sheathing. The 12 by 12 timbers of the cage shaft were carried down to and set on the rock.

In the rock section the timbering is of octagonal shape of 12 by 12 beams, braced with others of the same size. The guides were 6 by 12. The two-inch plank sheathing of the shaft is carried down to the tunnel intersection.

The headframe is of 12 by 12 timbers set in rectangular form and is thirty-two feet high, though there is an extra bent on top for support of the cage sheave, which increases the height to 45 feet. The diagonal braces are 3 by 10 and the others 6 by 12. The frame is 28 feet square.



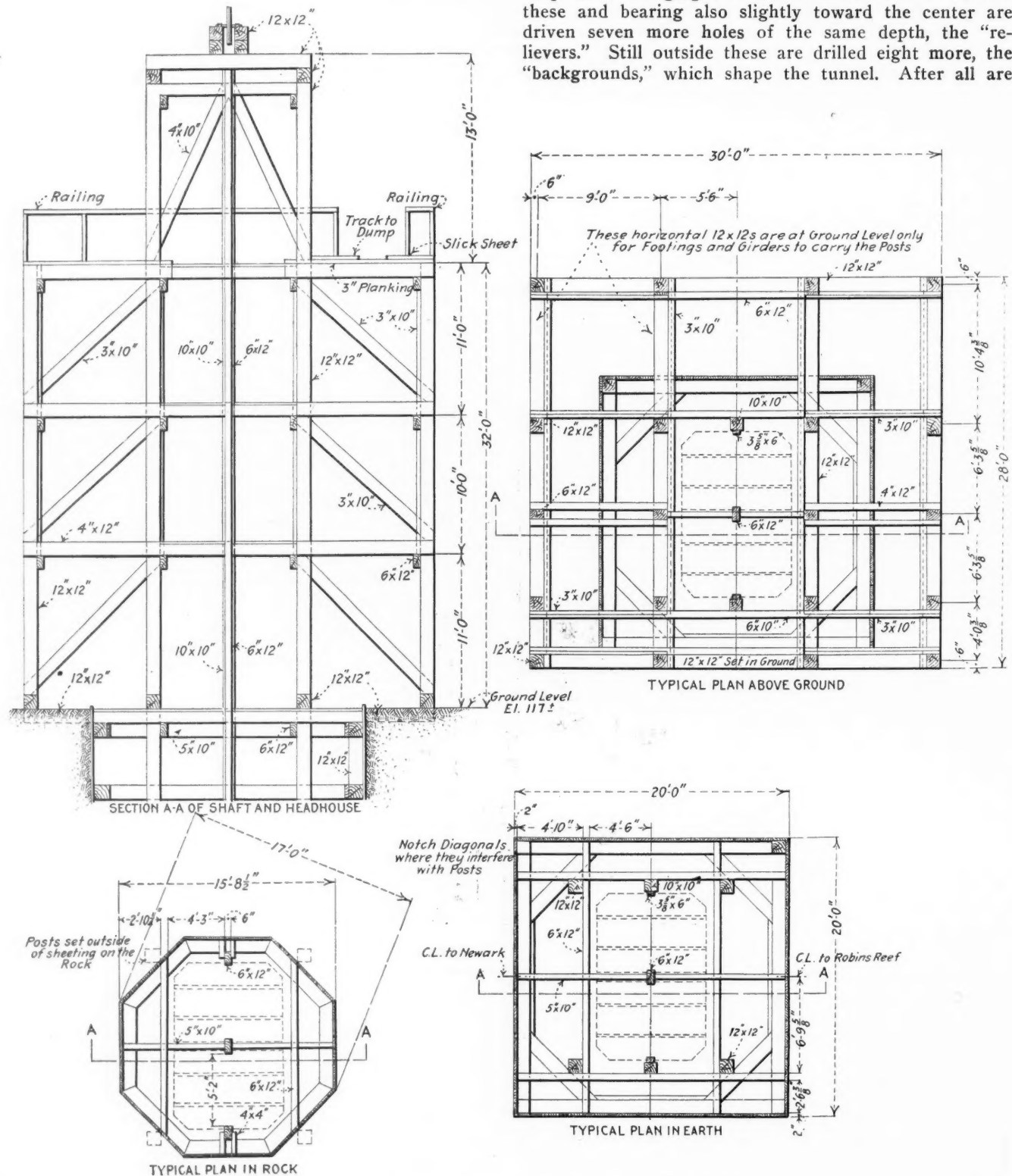
Courtesy Newark Evening News.
SHAFT BEING SUNK THROUGH CAISSON IN NEW YORK BAY, AT ROBBINS REEF.

A landing is placed at the top on the frame proper and at this level (32-feet) the cars from the tunnels are unloaded from the cage and run out over the trestle to the dump, which is located nearby.

Two balanced cages, each 5 feet by 8 feet in size, are in use. A Lidgerwood electric hoist is used for handling the cages, one of which is at the bottom while the other is at the top. The cages are set parallel to each other and the tunnel tracks lead directly onto them. The dinky cars carrying the broken stone and muck are of the rotary dump type, have a 30-inch gauge and a capacity of 27

cubic feet. A General Electric storage battery locomotive is used to handle the cars in the tunnel. At the top, two men push the loaded cars to the dump. The stone, which is for the most part trap, is stored in piles. Later, that suitable will be crushed and used for concreting the tunnel.

All the tunnelling is done by the heading and bench method. In the headings the work of driving the tunnel is practically the same as that described in the January 21st issue. Five drillers and six helpers are usually employed in a heading at one time. Six holes, forming the "cut," are first driven, the holes being about ten feet deep and converging toward a common center. Outside these and bearing also slightly toward the center are driven seven more holes of the same depth, the "relievers." Still outside these are drilled eight more, the "backgrounds," which shape the tunnel. After all are



TIMBERING OF HEAD HOUSE, JERSEY CITY SHAFT NO. 2.

drilled, each row is loaded and fired in turn, though in rare instances all rows may be loaded at once to prevent them being blocked by debris. About 50 pounds of DuPont's 60 per cent gelatin is used for each row, or a total of 150 pounds for a heading.

The heading is excavated for about 8 feet down from the roof. The remainder, the "bench," usually extends back about 25 feet from the heading, and a section of this is blasted out at the same time that the heading blast is fired. To remove the bench, seven holes are drilled vertically into it. A single blast will usually advance the heading from six to ten feet.

As soon as the blast is fired, the work of removing the broken and shattered rock or "muck" is begun. Iron pipes are wedged into the sides of the tunnel at about the height of the bench and planks three inches thick and about two feet wide are laid over these as runways. Under these, the train of four one-yard cars is pushed by the electric locomotive. Nineteen muckers make up the party for work in one heading, and of these usually about five have wheelbarrows. The others of the gang with pick or shovel load the stone into barrows, which are wheeled out over the runway and dumped into the cars underneath. At first, when loose rock is mostly encountered, all men use shovels; later some use picks to loosen the rock. Pieces too large to handle are broken up.

Working in the above manner, a gang of muckers will remove in one eight-hour shift (which is the equivalent of about six hours of actual work) one hundred yards of loose rock or about 60 yards of solid rock. While the muckers are working in one heading the drillers and their helpers are at work in the other, the work going on in three eight-hour shifts. The maximum progress in any one calendar month in one heading has been 335 feet, and the average monthly progress has been 250 feet.

While the muckers are loading one train with the rock, another string of empties is being pushed in on the other track. (There are always two tracks at the heading and also near the shaft, in order to facilitate the handling of the cars.) When a train is loaded, it is hauled to the shaft. The shaft attendant and his helper push the cars onto the cages and send them to the top, whence they are dumped and returned to the tunnel.

Every fifty feet in the tunnel, the engineers of the Passaic Valley Sewerage Commission put a plug in the roof, exactly over the centerline of the tunnel, and either at the correct elevation or at a known offset. Lights suspended 7½ feet from the plugs (plus or minus the offset as the case may be) are then at the centerline and a line through them prolonged gives the location of the center of the tunnel heading. This latter work is usually done by the tunnel superintendent. In much the same way, when trimming the tube down to proper size and cross-section, a string is stretched along the centerline of the tunnel as determined by offsets from the roof plugs. A pole 7½ feet long is then used to try the distances from the string to the circumference. This shows at a glance those pieces of rock which have to be removed to make the outline of the tunnel conform to specifications. For more exact work, or to secure the cross-section of the tube, a "sunflower" transit is used and the points on the circumference are located by polar coordinates.

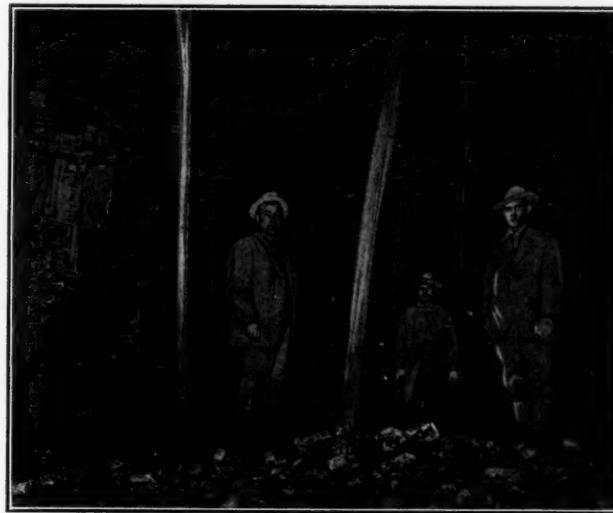
In the tunnel under New York bay considerable water has been encountered. About 1,000 feet from the No. 2 shaft a blast cracked the roof of the tunnel and let in two large streams of water. The holes were finally plugged and the work resumed, though the leakage was still considerable. About 1,400 feet from the shaft, and after driving through a couple of hundred feet of poor rock, mud and gravel were struck, which entered through a hole about 4 feet in diameter. Although this was

quickly plugged with sand bags, etc., about three hundred gallons per minute of water are entering the tunnel.

The main sump pit is located some twenty-five feet back from the shaft which, by chance, was sunk directly through a fault in the rock. For a width of 30 or 40 feet through the fault, the rock is ground to such small pieces that it can readily be taken out with a pick and shovel. It was for this reason that the sump was located away from the foot of the shaft. Timbering was necessary through the fault.

A Cameron air-driven pump with a capacity of 250 gallons per minute is located at the foot of the shaft and this pumps fresh water through a 5-inch line to a tank at the surface. From this tank the water is sent back underground for use in the tunneling or is used to cool the compressors or other machinery. At about the place where water first entered the tunnel (1,000 feet from the shaft) are set two Blake air-driven pumps, each having an approximate capacity of 250 gallons per minute. They keep the tube free from the salt water, which is forced through a 5-inch main to the surface.

Practically all the machinery here, as at the Bayonne shaft of the New York and New Jersey Construction Co., is electrically driven. Two phase alternating current at a voltage of 2,200 is obtained from the Public Service Corporation. Two Ingersoll-Rand electrically-driven air



Courtesy Newark Evening News.

LEAKS IN ROOF OF TUNNEL UNDER NEW YORK BAY,
CAUSED BY BLAST.

compressors, each having a capacity of 700 cubic feet of free air per minute, furnish the compressed air used on the work. This is supplied through a three-inch wrought iron main and is carried to the drills through ¾-inch hose. A pressure blower ventilator supplies fresh air through an eight-inch galvanized sheet iron pipe. Slip joints with a sleeve covering a tarred cloth packing are used at connections.

No. 18 Leyner-Ingersoll pneumatic hammer drills mounted on vertical columns are used. The points of the drills are star-shaped and a hole is cut through the core of each. A drill point will usually cut about two feet of rock before it becomes dull; at every two feet, as well, the drill is changed for one of slightly smaller size to prevent binding in the hole. Through the ¼-inch hole in the core, water is sprayed, which washes out the stone dust. Every driller and his helper are supposed to drive about 50 feet of hole per day of eight hours.

Some difficulty was experienced in the sinking of the shaft in the bay. A dock 70 by 90 feet was first built over the site selected for the shaft, but later this was increased in size to 100 feet square. The dock was set on piles

driven to resistance in the mud of the bay. Inside the dock a circular wooden caisson was sunk through the mud and water, the caisson being of wood, 21 feet in outside diameter and made of 4 by 10-inch long leaf yellow pine, planed to $3\frac{3}{4}$ by $9\frac{3}{4}$ tongued and grooved for radial joints with a 10.5-foot radius. The cutting edge was composed of a $3\frac{1}{8}$ by 4 1-16 by 5-16 Z bar rivetted to a 10 by $\frac{1}{2}$ -inch plate. The caisson was reinforced inside with 4 by 3 by $\frac{3}{8}$ -inch angles, located from each other at distances depending on the depth below water level for which they were designed. Joints were made at 16-foot intervals by means of 6 by 4 by $\frac{3}{8}$ -inch angles, a 5 by $\frac{3}{8}$ -inch plate and a 4 by 3 by $\frac{3}{8}$ -inch angle. Excavation for the shaft was carried on inside this caisson.

Piling is being driven around the dock and the space around and under the dock will be filled with the rock taken from the tunnel. A McKiernan-Terry steam hammer is doing all the work of driving the piling. Two-inch planks are used to encase the dock, but Lackawanna steel piling has been used to line the shaft. This was necessary because the caisson, after being sunk about 30 feet, struck a sloping bank of hard clay, through which it was almost impossible to drive. Accordingly, the plan of sinking the caisson was abandoned and steel piling was driven inside the shaft. Excavation then proceeded and the dirt and mud was taken out with a derrick and bucket. Rock was struck at elevation 36 (water level is 100) and, at present, tunnel elevation of 18 has been reached.

The terminal chamber will be located at Robbins reef, about 4,000 feet from the bay shaft. It will be built of concrete, with granite facings, circular below and octagonal above. It will be 55 feet in diameter and will extend 25 feet above mean water level. Its foundation will be in the cemented triassic formation 34 feet below water level, giving it a total height of 59 feet. Just outside the chamber will be driven two rows of steel sheet piling six feet apart, and the space between these will be filled with clay puddle. Outside this piling there will be trap or granite rip-rap of two to five-ton stones, which will protect the chamber from wave action. The granite masonry will be dogged or clamped together by means of $\frac{3}{4}$ -inch diameter galvanized clamps. Each clamp is to have a bent leg four inches long on each end, and these legs are to be cemented in holes drilled into the granite or embedded in the concrete.

The concrete lined sewer tunnel reaches a point directly under the terminal chamber, where it turns upward with a 90-degree bend. At this point the cross-section changes from 12-foot circular to one of elliptical shape 8 feet by 18 feet, which gradually increases until, when the chamber is reached, it is 8x23. At this point it discharges through three 54-inch gate valves into the concrete outfall pipes. This section of the pipe is of concrete at least three feet thick and is reinforced with $\frac{3}{4}$ -inch square twisted steel rods.

Passing through the three gate valves, which are to be controlled by means of hand wheels in the room above, the sewage will pass into the 96-inch outfall pipes. These pipes, which are of reinforced concrete, leave the terminal chamber at a 45-degree angle with each other. Several hundred feet from the chamber each pipe breaks up into a number of smaller ones, which again subdivide radially until the final discharge is through 156 specially designed nozzles, which give the sewage a whirling motion as it is discharged, mixing it thoroughly with the surrounding water.

The tunnel work is in charge of John F. O'Rourke, president and chief engineer. John Kirgan is general superintendent in charge, and Wesley Steenburg and Charles Marion are shaft superintendents at shaft No. 2 and the bay shaft, respectively.

REPAIRING A CRACKED SEWER.

BY LEWIS B. LAWRENCE.*

In 1899 the city of Passaic, N. J., had a 30-inch storm water sewer built on Hope avenue, for a length of about 860 feet, between Quincy and Sherman streets. Unfortunately, proper attention was not paid to the condition of the ground, which is a sandy loam, and was very wet at the time of the laying down of the pipes. It resulted that, on account both of unequal settlement and of the non-resistance of the soil on the sides of the pipes, too great pressure was exerted by the soil upon the sewer, and after only a few years of service it was discovered that the pipes were cracked in a very bad way, and that several joints were far from being tight.

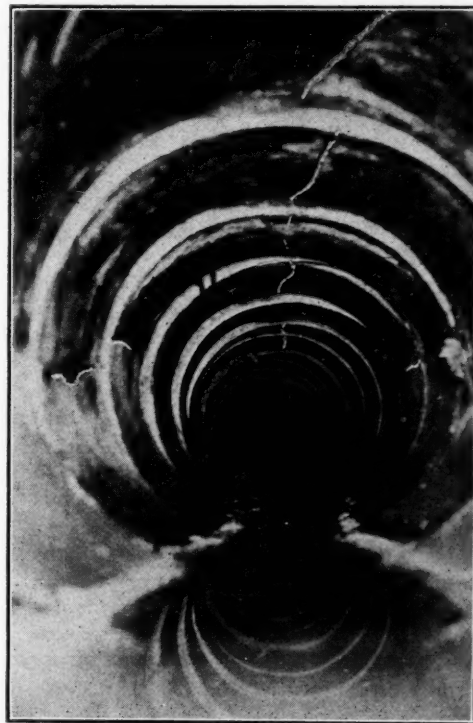
In 1914 the matter received serious consideration, and a resolution was passed upon by the Board of Commissioners, ordering either the repairing of the sewer or, if the cost of such repairs was to exceed a certain amount, the construction of an altogether new sewer.

On December 2d a careful investigation of the sewer condition was made by city engineer Colin R. Wise and others (among which was the writer), and photographs were taken, one of which is shown here.

The sewer was found cracked for over half of its length, and at some places the settlement had been so great that the pipes had a nearly oval shape. Several joints, too, were in so bad a condition that the end of one pipe was fully three inches from the bottom of the bell of the next one.

The cracks on top of the pipe can be clearly seen in the photograph, and similar cracks had developed on both sides of the sewer also.

It was then decided to repair the sewer, and the following plan was adopted:



INTERIOR OF SEWER, SHOWING CRACKED PIPE.

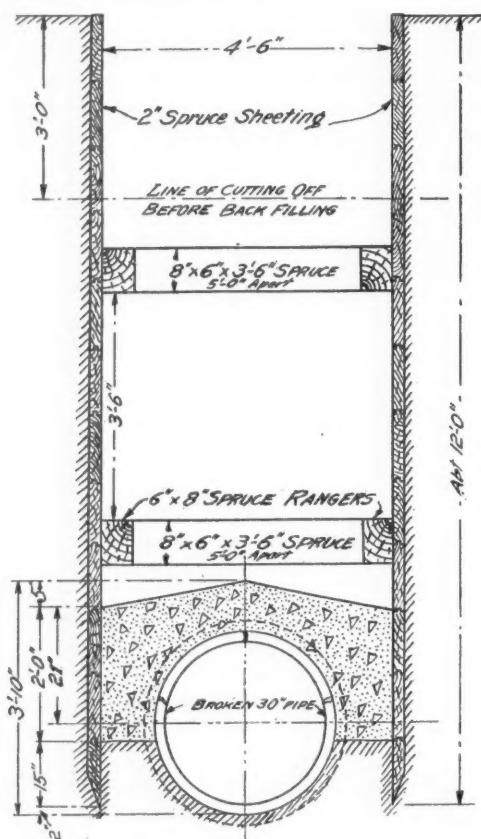
The 30-inch vitrified pipe, wherever cracked, is to be embedded in at least 9 inches of good concrete, and the trench must be strongly timbered, as shown by the accompanying sketch, so as to prevent any settlement, either during the repairs or after.

The concrete reinforcement of the vitrified pipe is to be allowed to set properly, and then the timbering must

*Assistant City Engineer, Passaic, N. J.

be cut about three feet below the surface of the street, leaving the rest in place.

The concrete specified is to be made of one part of good Portland cement, three parts of clean, well graded sand, and six parts of broken stone, all numbers of parts referring to measures of volume.



METHOD OF REPAIRING SEWER.

The specifications require a thoroughly compact back filling, so as to permit the sheet asphalt pavement to be hurried along in the early part of this spring on that part of Hope avenue, without any danger of settlement taking place afterwards.

In the place where the original settlement has been so bad as to deform entirely the shape of the sewer, it was decided to remove the broken sections, and to substitute for them new 30-inch double strength vitrified sewer pipe.

During the inspection trip through the sewer, on Dec. 2nd, 1914, a very bad smell was noticed in the pipes, and upon close examination, it appeared that an overflow pipe of the sanitary sewer was connected with the storm water sewer—a construction which does not reflect advantageously on the designer of this old sewer.

The work of repairs to the storm water sewer amounts to about 470 lin. ft. of concrete reinforcement, 50 lin. ft. of new 30-inch pipe, 20 joints to be recemented from the inside, and two bottoms of manholes to be reconstructed. The contract was awarded to N. A. Pietroniro, contractor, of Paterson, N. J., for the following prices: Concrete reinforcement, \$2.65 per lin. ft.; new 30-inch sewer pipe, \$3.40 per lin. ft.; cementing joints, 30 cents per joint, and manholes, \$3.00 per bottom. The total approximate cost is \$1,421.50, and the work is to be completed in thirty-five working days.

MUNICIPAL LIGHTING IN OPELIKA.

Opeika, Ala., Charles Shaefer, superintendent, states that its lighting plant is making about 10 per cent on the investment after paying all indebtedness, including interest on bonds.

PUBLIC COMFORT STATION

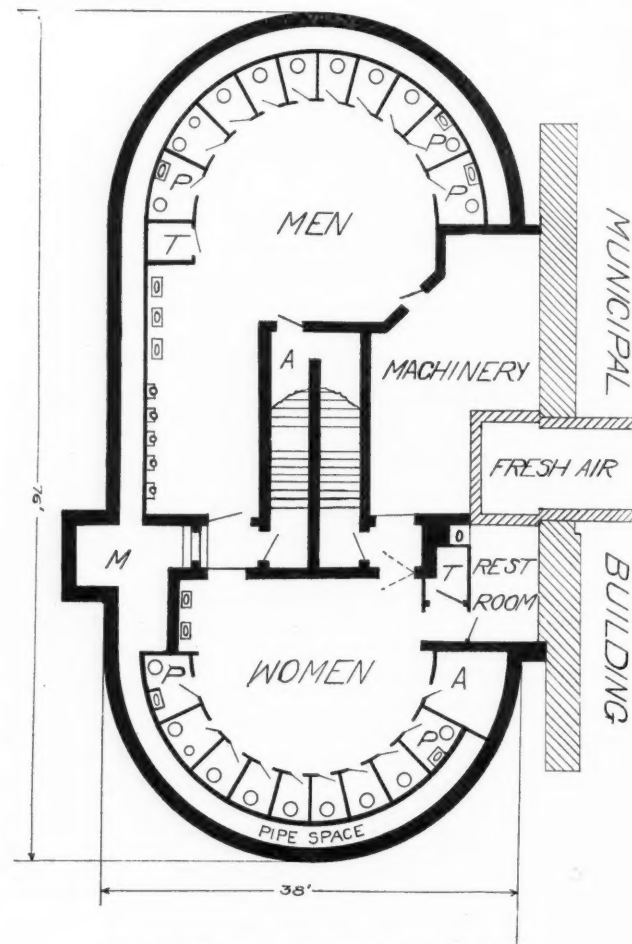
Now Under Construction in Springfield, Mass., at a Cost of Twenty-four Thousand Dollars—Arrangement and Construction Details

BY H. L. SPRAGUE.

A public comfort station for the city of Springfield, Mass., is now well under way. It is located to the east of the new municipal group, in the center of the city, and opposite court square, the traffic terminal for street car service.

The arrangements for constructing the station were placed in the hands of a special city government committee composed of three aldermen and two councilmen, of which R. N. Ingersoll is chairman. An appropriation of \$24,000 was made for the erection and equipment of the station, the greater portion of which will be expended before the building is completed.

In general the building is of concrete, 76 feet long and 38 feet wide, semi-circular at each end, placed entirely underground except the entrance, which consists of two parallel stairways, one for men and one for women, covered with ornamental cast iron and glass sides and a skylight roof, similar in design to a subway entrance. The two stairs are of terrazzo with safety treads and are separated from each other by a wall built of enamel brick. Each stairway is provided with a vestibuled entrance.



PLAN OF PUBLIC COMFORT STATION.

The station proper is divided into two main compartments, one for men and one for women, with an annular space or pipe gallery nearly encircling the building, the floor of which is 15 inches below the main floor of the station. At a point marked "M" on the plan is an enlarged part of the gallery where the sewer and sewer

emergency valves, the water supply and meters, enter the building from the street.

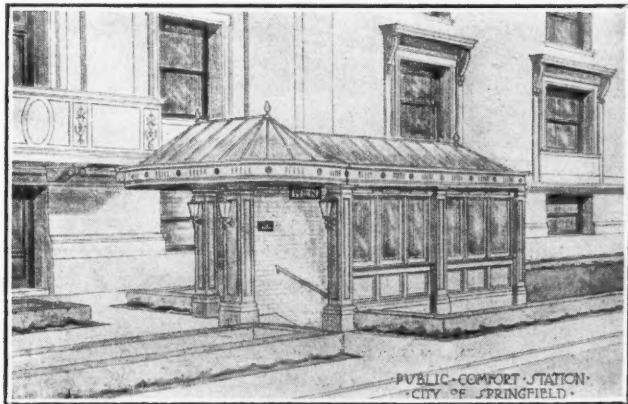
The women's compartment contains two pay stations (marked "P" on the plan), six free closet stalls and one combination adult and juvenile stall, two lavatories, a drinking fountain, telephone booth (marked "T"), a rest room with lavatory, and an attendant's room (marked "A").

The men's compartment contains three pay lavatories (marked "P"), six free closet stalls and one free combination adult and juvenile, a drinking fountain, three lavatories, six stall urinals, a telephone booth and an attendant's room.

The room marked "Machinery" on the plan contains the heating and ventilating apparatus and a slop sink. The heat is supplied from the municipal building adjacent thereto; fresh air being supplied through the duct marked "Fresh Air," which duct also supplies fresh air for the municipal buildings.

The heating and ventilating apparatus comprises two separate and independent installations, one an exhaust fan with belt-connected motor and the other an intake fan with a direct-connected motor of the same size.

The capacity of the fan at normal speed is approximately 3,200 cubic feet of air per minute, both for the supply and discharge, making approximately a complete change of air every 5 minutes. The exhaust or foul air is taken from the building through ducts of ample size at the rear of each closet bowl, through the fan into the sub-basement of the municipal building and upward to a point far above the roof of the office building where it is discharged to the open air. The intake or fresh air is distributed through the ceiling at the proper places through brass registers having operable dampers therein.



SPRINGFIELD'S PUBLIC COMFORT STATION.

The underground parts of the building which are accessible to the public are wainscoted to a distance of 6 feet 8 inches from the floor with structural glass (Vitrolite). The stall partitions are similarly constructed and the distance from the top of the vitrolite wainscot to the ceiling, as well as the ceiling itself, is finished in hard plaster with steel trowel finish.

The entire floor is of Terrazzo with an integral cove base, 6 inches high.

The entire building is electrically lighted day and night, for the most part with ceiling lights.

All piping is located in the gallery, the same being exposed, with ample clean-outs, a back water valve and an emergency gate valve having been provided. The plumbing fixtures are of the very best and have been supplied by the Phillips Lead & Supply Co., of Providence, R. I. All free closet fixtures are of the seat action type, operating a "Philco" flushing valve located just inside the gallery partition. The flushes of the urinals and paid closets are operated by push buttons concealed in the gallery.

All exposed metal, including plumbing fixtures, pipes, faucets, door trim, electric fixtures, signs, etc., are golden brass, to match, so that same may be scoured and polished.

All stall doors are of mahogany provided with observation openings for the convenience of the attendant, and are so arranged that when the stall is not in use the door remains open.

Inter-communicating doors have been provided between the men's compartment and the women's compartment so that in case of an emergency one attendant may come to the assistance of the other.

The entire roof of the station has been rendered waterproof and an ample layer of loam covers it so that lawn, hedges and shrubbery may be grown thereon.

The architect and engineer of the station is H. L. Sprague, and the general contractor is the A. E. Stephens Company.

It is the intention of the committee to open the building for the use of the public in the early spring.

AKRON CURBS AND GUTTERS.

By J. A. GEHRES.*

The recent construction of curbing in Akron, Ohio, is indicated by the following statement of the amounts of stone curb as compared with concrete combined curb and gutter for the past three years. In 1912 the amounts laid of stone and of concrete respectively were 14,673.6 and 70,849 lineal feet. The amounts in 1913 were 9,308.9 feet of stone and 52,979.8 feet of concrete curb and gutter. In 1914 the relative positions were decidedly reversed and there were laid 79,031.2 feet of stone curb and 18,731 feet of concrete curb and gutter. The main reason for the increased use of stone curb in 1914 was that this was demanded in the petitions of the abutting property owners, who preferred to pay a few cents more per foot front for the stone than to lay concrete and run the chance of having the latter go wrong after the first winter.

The price for straight stone curb in place is from 45 to 50 cents per foot, and that for straight concrete curb and gutter is 45 to 55 cents per foot, while the additional cost for curved stone is 25 cents per foot, and for curved concrete with corner protection is the same. The average price for brick pavement on a 4-inch concrete base with a grout filler is \$1.50 per square yard; hence, since stone curb and combination concrete curb and 24-inch gutter are constructed at the same price per lineal foot, in using stone the owners would pay an additional amount equal to the cost of the gutter, or 33 1-3 cents per foot.

It is found that the city officials receive no complaint where stone curb is used, but if cement curb is used and a single piece goes wrong, every property owner seems to learn of it and condemns the whole job, and the responsibility is difficult to place between the contractor and inspector.

Believing that factory-made curb would be better in quality than curb made on the street, bids were taken on this kind of curb and a price in place received of 45 to 60 cents, or about the same as stone. The fact that stone curbing can be reset lower for private driveways at any time after the street is completed is in its favor. On a great number of residence streets there are vacant lots, and it is impossible to tell, when setting the curb, where in front of these a concrete driveway may be wanted. If stone curbing has been laid, this can easily be lowered wherever desired in the future. In case of widening the roadway, as frequently happens, stone curb can easily be reset. On East Market street a stone curb put in over thirty-five years ago has been reset to widen the roadway three different times and is still as good as ever.

* City Engineer, Akron, Ohio.

U. S. PUBLIC HEALTH SERVICE

Engineering Activities of the Service—Study of Pollution of Inter-state Navigable Streams—Institutional Sewage Disposal—Drainage—Rat-proofing.

BY H. P. LETTON.*

Under the Act of August 14th, 1912, the United States Public Health Service was given authority to investigate "sanitation and sewage and the pollution, either directly or indirectly, of the navigable streams and lakes of the United States."

In order to carry out the provisions of the above statute it became necessary to employ sanitary engineers. The first engineer was appointed July 1st, 1913, and the force has grown until at the present time there are seven men so employed.

The first work of any magnitude to be taken up for study was that of the pollution of interstate navigable streams. For the purpose of this study two streams were selected, namely, the Ohio river and the Potomac river. The purpose of these studies was primarily to determine the amount and character of pollution and the rapidity and causes of the self purification of the stream.

The Potomac river drains an area of about 14,000 square miles. From the mouth of the river at Chesapeake bay to Washington, a distance of 100 miles, the river is in reality a tidal estuary. Above Washington the stream is a normal inland stream draining for the most part a mountainous territory, comparatively heavily populated by a people engaged in agriculture, mining and lumbering. At Washington the river receives the sewage of approximately 400,000 persons, while below Washington it receives practically none. It thus afforded an ideal situation for a study of self purification, in that the pollution could be traced down the river. Another important point regarding this river is the fact that for the lower 40 miles it contains extensive oyster layings, whose value depends to a large extent upon their sanitary conditions.

In connection with this study about 15,000 samples of water were collected at various selected points below Washington. These samples were examined both bacteriologically and chemically. A study was also made of the plankton or microscopic organisms at various points in the river to determine what effect, if any, they have on the sanitary character of a river. Samples of mud from the river bottom were collected and examined. A comprehensive study of the tides and currents in the vicinity of the sewer outlet was made in co-operation with the Coast and Geodetic survey. Stream flow data were obtained from the United States Geological Survey, and from all these data the times of flow between various points on the river were computed. A sanitary survey was made of the entire water shed to determine the character and extent of the pollution and to determine the extent of use of the surface waters as sources of public water supplies. The above described work was carried on over a period of 12 months in order that all conditions of the river might be studied. This study developed many interesting facts regarding the disposal of sewage by dilution and the self-purification of streams. A complete report has been prepared and will shortly be published as a Hygienic Laboratory Bulletin.

The Ohio river is of much greater magnitude than the Potomac, draining about 200,000 square miles, which area embraces parts of 14 states. For the purpose of this study laboratories were established at six different points extending from Pittsburgh, Pa., to Paducah, Ky., a distance of 925 miles. The studies on the Ohio were similar

to those on the Potomac, although the problem was considerably more complicated due to the addition of large amounts of sewage at many points and to the numerous important tributaries entering the main stream. A report on these studies is in process of compilation at the present time.

The studies of the above rivers brought out the fact that the pollution of the streams by trades wastes was an important one, and it was, therefore, deemed advisable to make investigations of certain typical prominent trades wastes, in order to determine whether or not some economical and efficient means might be devised for handling these wastes. In connection with this an experimental plant has been constructed at the tannery of the Deford Tanning Company, at Luray, Virginia, where tannery wastes is being studied. Similar studies are being carried on in Indiana as regards straw board wastes and in New York as to cannery wastes.

The Service is constantly receiving requests for literature regarding the disposal of sewage from isolated houses or institutions. Although the methods for disposing of sewage of cities have been studied to a great extent and certain methods have been found practical, no especial attention has been given to the disposal of sewage in instances as stated above. Where plants have been constructed for this purpose they have usually been built along the same lines as city plants but much reduced in size. Since one of the vital points of efficient sewage disposal for cities is proper operation, most of these small plants have failed to give satisfactory results, as it is impossible to expect any degree of care in the operation of plants of this type. For this reason two experimental plants have been constructed, one at the Hygienic Laboratory in Washington, receiving the sewage from the Nurses' Home on the grounds of the Naval Hospital adjoining, and the other at a small suburb of Washington, where it receives the sewage of about fifty people. It is hoped from these experiments to determine a proper solution of the problem.

Another branch of the engineering work is that in connection with malaria studies. The Service has for some time been studying the prevalence of malaria throughout the southern states. It is intended to increase this work and to make comprehensive plans for the eradication of the disease. In this connection a study is also being made of the effect of impounded waters on the production of malaria.

The presence of bubonic plague in New Orleans, La., has brought to the front the question of rat-proofing. This is primarily an engineering problem, and in connection with it Service engineers have formulated general plans for the rat proofing of many large structures, an example of this being the docks of the city of New Orleans, where work has been outlined which will cost in the neighborhood of a million dollars.

In connection with the studies of rural sanitation being carried on at the present time, the services of an engineer are necessary for the purpose of studying and giving information on water supplies, sewerage and sewage disposal, and on malaria prevention.

In investigations of the cause of outbreaks of typhoid fever by epidemiologists connected with this Service, it is highly desirable that a sanitary engineer co-operate in the work, the engineer giving his whole attention at once to the character of the water supply while the epidemiologist is determining whether or not the water supply is to blame for the outbreak.

On requests of state health departments engineers have been sent on several occasions to advise certain towns in a general way as to water supply and sewerage conditions.

*Sanitary Engineer of the United States Public Health Service.

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for. Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

FEBRUARY 18, 1915.

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More Care in Sewer Construction.

Sewers are, we believe, the least expensive public utility which is to be found in our city streets. The cost of the minimum size water main (4-inch) laid in place is not less than that of the minimum size sewer (8-inch) laid at ordinary depth; and in addition we have, in the water system, reservoirs, pumping plants, etc. Street paving costs more per lineal foot of street than either, even with the narrowest roadway and cheapest class of wearing surface. And yet the last is probably the least essential to a civilized community.

Are not many of our sewers too cheap? Is it not too often the case that the cost of labor put into them is more or less regulated by the cheapness of the material used rather than the importance of the result to be obtained?

A sewer should be laid in straight lines or regular curves, and its grade should be as nearly true as it is possible to make it. Take a grade of one foot in one thousand (by no means unusual for 24-inch pipe and larger) and pipes 30 inches long. Then the fall in each pipe is three one-hundredths (or about one thirty-second) of an inch. Not only should care be taken that each pipe be set with less than this error in grade, but it should keep that exact position both during the remainder of the construction and afterward. Any departure from it

will cause a damming of sewage above a high joint or a possibility of deposits at a low one, should the sewer at any time flow with very little depth; and with deep flow the irregularities will cause vertical eddies which will retard the velocity of flow and possibly cause deposits thereby. And deposits in sewers are the one thing above all others (except inadequate capacity) to be avoided. A sewer in which there are no deposits gives off no odors which can reach either street or connected building, and the sewage reaches the outlet or disposal plant in a fresh condition. But gases given off by putrefying deposits in sewers are a source of nuisances which some cities are spending thousands of dollars to palliate, and which may effect a disintegration of mortar in pipe or brick joints, or the concrete in a sewer shell.

Even more serious may be the results of settlement after construction, for these not only produce irregular grade, but probably open up joints and allow the sewage to pollute the soil, or ground water to enter the sewer (perhaps bringing sand or other soil with it) and increase the volume to be carried and perhaps pumped or treated. Leaking joints, although serious defects, are so common as to be the rule rather than the exception. And yet such joints cost many thousands of dollars yearly in increased pumping, larger purification plants, and larger sewers for carrying the "allowance for infiltration"; with probably increased deposits of inborne dirt to be removed—and deposits mean putrefaction.

No one will claim that tight joints are impossible, we believe; only that they are expensive, relative to the cost of the sewer. Nor will any deny that it is possible to construct a sewer that will not settle, no matter what the soil. But sewer construction has so long been looked upon as cheap construction that too many fight shy of anything that increases its cost. To them, bearing piles in bad bottom or a concrete cradle in soft earth, or the latter and a concrete collar at each joint to exclude ground water, are expenditures not to be considered for sewers, although for any other structures they would be deemed most necessary precautions.

The fact that a sewer is out of sight and seldom inspected even by those in charge of it; that reaching it for repairs is a very expensive and annoying matter, and that the materials and labor employed on it are relatively inexpensive, are all reasons for giving it the most careful attention to secure the best results rather than practically leaving the entire matter in the hands of an unappreciative foreman.

Public Comfort Stations.

During the past seven years Municipal Journal has published descriptions of fifteen public comfort stations and more or less detailed reference to about the same number of others. Each of these differed from most of the others in plan and details of arrangement, but up to 1910 had one feature in common—they were all under ground except two on side hills, which were under ground at the rear but above ground in front. During the last four years, however, three-fourths of those described have been above ground, not including the one described in this issue.

There are, of course, good reasons in many cases for placing these structures under ground, among these being the lack of public space in the congested part of the city, where they are most needed, and where they must be placed under the sidewalk or roadway if at all. But perhaps the majority of them are placed in parked spaces, where plenty of area is available.

There are the best of reasons why these conveniences should be above ground. If any place needs ventilation,

for frequent renewal of air and removal of odors; and abundant sunshine, because it is the best and cheapest universal germicide we have (there is little, if any, germicidal value in the odor-destroyers used in such places); and both, to dry the floors and other parts of the structure after the frequent washings which they should receive, it would seem as though a public comfort station needed these. Instead, we find artificial light, which has little, if any, effect upon moulds and germs; and forced ventilation, which is seldom better than a poor substitute for the free circulation of air from windows on all sides. With all classes and conditions of the washed and unwashed and diseased using the rooms, they should be the most rather than the least sanitary of a city's public places.

It may be that a false modesty dictates placing these stations under ground to conceal them; but public opinion in this country long ago ceased to hold such ideas (it never held them in any other country); and concealment greatly hinders their service as a public utility for the occasional visitors to that section of the city, who may be unfamiliar with the location of them.

HANDLING SEWAGE SLUDGE*

Depositing on Land—Mechanical Dewatering—Digestion—Recovering Valuable Ingredients—Illustrations from European and American Practice

The most serious part of the problem of sewage disposal is the handling of the sludge which results from every known method of treatment. It is possible that in the future, in order to meet higher standards of hygiene and cleanliness, methods may be devised for intercepting sewage solids as near their place of origin as possible and before they have become offensive, and also to recover practically all of their ingredients which have value prior to their breaking up and in part entering into solution. But no practical methods of accomplishing these ends are yet known.

One of the difficulties of handling sludge is the enormous quantities produced. London, with a population of six million tributary to the sludge works, produces by chemical precipitation 2,597,000 tons per annum of wet sludge of 92 per cent moisture. The district of Birmingham, England, with a population of 950,000, treats and disposes of 427,000 tons per annum of wet sludge of 94.5 per cent moisture. Experience with sewage works indicates that on the average 1,000 persons produce 45 tons of dry sludge matter per annum. If this were deposited in tanks as sludge containing 90 per cent moisture it would make 524 cubic yards.

One of the most important considerations in handling sludge is the percentage of moisture which it contains, as this determines its bulk. Of the dry residue in sludge, approximately one-half is organic and one-half mineral. A large part of the organic matter in freshly deposited sludge is highly putrescible, and if improperly handled produces offensive odors.

The final disposal of sludge is accomplished by (a) discharge of wet sludge in the sea; (b) depositing wet sludge on land; (c) the use of partly dried sludge for filling in low waste lands and where circumstances warrant; and (d) the use of sludge as a fertilizer, fertilizer base or as fuel. The first method is practicable for large cities located near the ocean. Sludge from the sewage of London, England, is collected on the Thames about

twelve miles below London Bridge and allowed to settle until it contains about 92 per cent moisture, when it is pumped into six tank steamers which transport it 55 miles to deep water in the open sea; an average of 8300 tons of sludge being thus disposed of every week day at a cost of 9 cents per ton. At Manchester, England, the sludge from septic tanks is carried by a tank steamer to the open sea, 215,082 tons of wet sludge having been so disposed of last year at a cost of about 15 cents a ton. Other large cities disposing of wet sludge in this way are Glasgow, Scotland, Salford, England, and Dublin, Ireland.

Depositing Wet Sludge on Land.—The disposal of wet sludge without prior dewatering may be accomplished by its application to land in several ways. The earliest method used was called lagooning in which case earth embankments were built enclosing an area of suitable land and the wet sludge run into a depth of as great as 10 ft. The clogging of the soil preventing free drainage of the moisture; the scum formation upon the surface retarding evaporation, and the frequent great depth of the sludge, all tend to prevent the sludge from drying. As an example, there are sludge lagoons at Birmingham, in which the sludge deposited many years ago is practically in the same condition as shortly after being placed except that a heavy crust has formed upon the surface. This method is rapidly being abandoned.

To overcome these objections and to dispose of the sludge more quickly, it was run upon the surface of farm land to form a shallow layer which would dry in a reasonable time and could then be plowed in and the field cultivated. But the gross nuisance created by the exposure of such large areas of foul smelling sludge led to the adoption of what is called trenching. As practiced in Birmingham, England, the trenches were dug about 3 ft. wide and 18 in. below the surface of the soil, the excavated earth forming banks between the trenches so that they can be filled to a depth of from 24 to 30 in. with wet sludge, after which the tops of the earth banks are thrown over the sludge to prevent nuisance from smell or flies. The porous earth absorbs the moisture and later the land is plowed across the trenches and placed under cultivation. This process can be repeated at intervals of from 18 months to two years.

The cost of trenching at Birmingham amounted to about 8 cents per ton of wet sludge. This is exclusive of the cost of sludging tanks, but includes interest on capital outlay at 5 per cent and rent of land. This method is not being used in new plants and is being abandoned in old plants on account of the area required, the interference which is caused in times of heavy storms, the increased difficulty of operating caused by winter weather and the general cumbersomeness of the method.

Mechanical Processes for Dewatering Sludge.—Among the early mechanical methods of reducing the bulk of the wet sludge by dewatering was pressing in machines which consist of a number of cast-iron plates generally 9 sq. ft. in area with corrugated faces and surrounded by a machined rim so that when placed together they form water-tight cells 2 in. thick. A central pipe about 6 in. in diameter extends through the middle. Over each plate a canvas cloth is placed and sludge forced into the press and subjected to a pressure of from 60 to 75 lbs. per sq. in. This squeezes the water out and the resultant cake contains between 50 and 65 per cent moisture and is about one-fifth the bulk of the original wet sludge.

It is necessary to add to the sludge before pressing from $\frac{1}{2}$ to 1 per cent of lime, the fine particles of which facilitate the passage of water, the dissolved lime agglomerating the solids of the sludge. The cost of sludge pressing largely depends on the amount of lime added,

*Condensed from a paper by George S. Webster, chief engineer of the Bureau of Surveys of Philadelphia, before the American Society of Mechanical Engineers.

the kind of sludge pressed and the magnitude of the works; in large cities the average cost is 10 cents per ton of wet sludge.

At Worcester, Mass., about 18,000,000 gal. of sewage a day is received at the chemical precipitation works. There are added 55.5 lb. of lime to each 1000 gal. of sludge, which contains on an average about 90 per cent moisture when pumped from the tanks. The presses reduce the moisture to about 70 per cent and 0.167 tons of sludge cake are obtained from each cubic yard of the wet sludge. The pressed cake is hauled in electrically propelled cars about a mile and disposed of for filling low waste land.

Another mechanical method of dewatering sludge is by means of centrifuges which occupy less space than presses and do not require the addition of lime to the sludge. Such machines are continuous in action and the work of extracting the moisture consists of two distinct and constantly repeated periods. During the first period the wet sludge is introduced into the machine and by the action of centrifugal force the moisture content reduced. During the second period the sludge thus partly dried is automatically ejected. The final product contains about 60 per cent moisture and occupies about one-eighth the volume of the wet sludge.

The largest installation of these machines is in Frankfurt-on-Main, Germany, where the sewage of 400,000 people is subjected to plain sedimentation and about 310 tons of wet sludge 90 per cent moisture obtained per diem. The sludge is pumped to overhead reservoirs and kept agitated by revolving paddles. From there the sludge is fed to 8 centrifugal driers capable of handling 325 cu. yd. of wet sludge a day of 10 hours. The dried sludge is carried by a conveyor through a tunnel heated by the exhaust gases from the power station and, as a 20 per cent moisture mass resembling soft coal of a gray color, is mixed with garbage and both disposed of by destructors, the steam being used for generating electricity for power and lighting.

Digestion of Sludge.—In the methods of sludge handling above described efforts were directed toward preventing the dissemination of the foul odors from the wet mass. Within recent years much thought has been given to devise processes of treatment by the digestion of the putrescible matters to produce an inoffensive sludge both as withdrawn from the tanks and during drying.

One of the methods to accomplish this purpose is to remove the freshly deposited sludge from the sewage sedimentation tanks at intervals and place it in separate tanks. Usually a scum forms upon the surface, beneath which more or less active fermentation and decomposition develops. New sludge is added and digested sludge withdrawn from time to time and the latter placed upon underdrained sand or cinder beds for drying. On account of the digestion of the sludge it dries more rapidly and is much less offensive than fresh sludge.

This method of sludge handling is now in use at Baltimore, Md., where the sewage is freed of its settleable solids in large tanks. The accumulated sludge is removed at intervals by centrifugal pumps and discharged into adjacent concrete tanks where considerable digestion occurs as indicated by the continuous ebullition of gas, which is inoffensive. At first the sludge was withdrawn from the digestion tanks and dried upon underdrained sand beds. It could be removed in a much shorter time than undigested sludge and but little offense was created. At the present time, the wet sludge from the digestion tanks is being sold to farmers for use on truck farms. The same method of separate sludge digestion is in use at

Birmingham, England, the dried material being used to fill in a deep ravine between railway fills.

For the last 20 years it has been known that the retention of sludge in the tank in which it is deposited, which is known as the septic treatment of sewage, resulted in the reduction of the bulk and offensiveness of the sludge, but experience showed that while the sludge was benefited, the water leaving the tank, known as the effluent, was seriously fouled by the decomposition of the organic matter in the sludge. The first attempt to obviate this fouling of the effluent was the digestion of the sludge in a separate tank above described. Another attempt was made by Dr. Travis at Hampton, England, who built a septic tank divided into upper and lower compartments; four-fifths of the sewage was passed through the upper part and the sludge settled through slots into the lower part through which the remaining one-fifth of the sewage flowed. Thus four-fifths of the sewage remained fresh but when the foully contaminated one-fifth was added to the tank effluent it frustrated the purpose. Furthermore, the passage of sewage through the lower part maintained conditions favorable to the development of sulphur bacteria and produced a malodorous sludge.

The separation of the digesting sludge from the settling sewage was adopted by Dr. Imhoff of Essen, Germany, in the two-story tanks known as Emscher or Imhoff tanks. Their extensive introduction in Germany and America is due to the fact that when properly operated they efficiently free the sewage of its settleable solids, yield a fresh inodorous effluent, produce sludge that is inodorous, of low water content and consequent small bulk, and which dries more quickly than any other kind of sewage sludge.

In normal weather, sludge from a matured Emscher tank will dry on sand beds in from 3 to 5 days to a consistency fit to remove, while sludge from septic tanks requires at least 2 weeks' time, and sludge from plain sedimentation tanks will require about 8 weeks in summer and at least twice that length of time in winter, to be dry and firm enough to handle.

Dried Emscher sludge is suitable for filling low land or use in agriculture, particularly in lightening heavy soils, as it is very spongy in texture due to the entrained gas. But experience has demonstrated that the use of air-dried sludge from any source will not give results comparable with those obtained from the use of artificial fertilizers.

The rapid drying of sludge digested in Emscher tanks allows of very much smaller sand beds than for other kinds of sludge; in fact, it is usual to provide only 1 sq. ft. of bed for each three persons tributary to the tank.

The Recovery from Sludge of Ingredients Which May Have Value.—Sludge contains ammonia, phosphoric acid, potash, grease and carbon. Generally speaking these ingredients are more costly to recover than they are worth. It has been estimated that the manurial value of excreta of one person in a year is \$2.62, but in the dilute sewage of America this would be contained in about 36,000 gal. of water. If this material is deposited as sludge of 90 per cent moisture it would weigh about 1720 lbs. per cu. yd., and each cubic yard would contain only about 80 lbs. of organic matter, of which only a part has any monetary value.

The problem of recovering the valuable ingredients in sewage sludge, therefore, involves the use of economical and efficient processes for drying or pressing to reduce the bulk for transportation; also in order to recover the grease in sewage with present methods, it is necessary to have the sludge in a very dry condition.

Dr. MacLean Wilson, chief inspector of the West Riding of Yorkshire Rivers Board, believes that the valuable ingredients of sewage will ultimately be extracted and utilized, since many capable experimenters are at work upon the problem. H. W. Clark, chemist of the Massachusetts State Board of Health, considers that sludge has some value, and that it seems inevitable that, as the processes of drying, pressing and fat separation are improved and as nitrogen advances in price, sewage sludge will become of greater agricultural value than at present; especially as a base for fertilizer, to be enriched by the addition of potash, phosphates, etc.

At Bradford, the center of the wool industry in England, large quantities of wool washing waters enter the sewers, amounting to one-tenth of the total sewage. These waters contain large amounts of grease, which is recovered by treating the sewage with sulphuric acid and heating it to 212 degrees, then pressing it hot. Most of the grease comes out in the hot press liquor, which is then boiled with chemicals and the grease separated, and sold at from \$35 to \$50.50 per ton. Excluding certain fixed charges, it is claimed that the grease is recovered in this way at a profit.

Enlargement of the sludge handling capacity of the Birmingham sewage works is contemplated by installing what is known as the Dickson process, as employed at Dublin. This is described as follows:

In this method of handling sludge about 0.5 per cent. of yeast is added to the sludge as removed from the tanks and the mixture pumped through a heater which consists in a number of pipes placed in the path of the hot air from the furnace to fermenting troughs in the bottom of which are hot air ducts to keep the fermenting sludge at about 90 degrees Fahrenheit. In 24 hours, as a result of the fermentation, there is a distinct separation of water, the sludge at a density of about 83 per cent. occupying the surface while the water can be readily drained away beneath. A compound of phosphates and potash in about equal proportions by weight of sludge and compound based on dry solid matter is then added and the mixture containing about 73 per cent. water is then pumped to the dryer, which consists of a cylindrical vertical casing containing a series of arms and platforms revolving upon a central shaft and between fixed arms and platforms. Air at a temperature of about 450 degrees Fahrenheit is blown into the dryer at the bottom and passes out the top. The dried mixture falls into a disintegrator which beats it up into a powder, which would be used as fertilizer.

Experiments made in the Philadelphia sewage testing station in burning dried sludge or wet sludge mixed with fine coal confirm the accepted conclusion that it is not practicable to recover completely the calorific value of the sludge in actual amounts of water evaporated by burning it. Where sewage works are near refuse disposal plants, however, the sewage sludge may some times be burned with the refuse, as is done at Frankfort-on-Main, Germany. At Ober-Schöneweide, near Berlin, layers of sludge of 60 per cent moisture and culm or dust of brown coal are run into a gas producer and utilized to run a 60-horsepower gas motor generating electric energy, which is used for power and for lighting the plant and adjacent streets. If all power could be sold at 2½ cents per k.w.h., this process would show a profit of 50 per cent on the net cost of production, exclusive of interest on invested capital. No nuisance whatever seems to be created by the plant. In Potsdam, also near Berlin, brown coal and sludge are mixed in the proportion of one coal to eight sludge in the sedimentation process, 150 grams of sulphate of iron per cubic meter of sewage being added also. These assist in the precipitation, and the mixture of sludge and coal is pressed into briquettes of 60 per cent moisture having a heat value of 1,500 units. These briquettes are the only fuel used in a city electric plant in an adjoining building. It is said that the cost of briquetting about equals the value of the electric energy. Experiments are being made at Birmingham, England, to utilize air-dried sludge by burning it in spe-

cially constructed furnaces, thus obtaining heat for the separate digestion of about one-sixth of the wet sludge by the new yeast fermentation process previously mentioned.

INVESTIGATING EXPLOSIONS IN SEWERS.

The serious explosion in a sewer of Pittsburgh, Pa., the investigation of its cause and of similar explosions elsewhere have been discussed in these columns several times during the past few months. The Bureau of Mines informs us that it is co-operating with the city of Pittsburgh in an investigation to determine the causes of explosions in sewers.

Special methods and apparatus have been devised to sample and test the air and many samples of sewer air have been examined. Gasoline has been introduced into sewers with special precautions to prevent accidents, and the amounts of different kinds of gasoline necessary to produce explosive mixtures under different conditions have been determined. Studies are also being made regarding the intrusions of natural gas, artificial gas, washings from garages, residues from cleaning plants, etc. All possible sources of ignition are being studied. A report of the investigations will be published as soon as sufficient data have been obtained. The work is under the supervision of G. A. Burrell, chief gas chemist of the Bureau of Mines, and H. T. Boyd, chemist of the city of Pittsburgh, with the collaboration of other members of the staff of the Bureau of Mines and the Public Safety Department of the city.

SLAG FOR CONCRETE AGGREGATE.

Comparative tests of trap rock and furnace slag as aggregate for concrete were made a short time ago by Prof. Harold Perrine, of Columbia University Department of Civil Engineering. The test consisted of making compression tests on 8-inch cylinders of concrete, mixed one part cement, 2 parts "Cow Bay" sand and 4 parts of either Palisades trap rock or slag furnished by the National Slag Company. The rock was separated into ¾-inch, ½-inch, ¼-inch and "dust," and then artificially recombined so that the grading was identical with that of the slag, which was used as received. The materials were proportioned by volume and mixed in a Blystone batch mixer.

When the cylinders were 28 days old they were tested to rupture. The trap concrete showed ultimate strength of 1,769 to 2,120 lbs. per sq. in., averaging 1,975.5 lbs; while the slag concrete showed 2,275 to 2,750 lbs., with an average of 2,465.5 lbs. The former weighed on the average 154.5 lbs. per cubic foot, and the latter 140.6 lbs.

STREET MAINTENANCE IN COLUMBIA.

From an article under this title in our February 11th issue there was inadvertently omitted a brief statement concerning the use made of the gasoline engine by Columbia, S. C., which statement is given below.

The gasoline engine is used for drawing the road grading machine and scarifier in resurfacing the 50 miles of sand-clay roads in the city, which require constant attention. The scarifier is first used to tear up the surface for a depth of from four to six inches, and the scarifier attachment is then replaced by the grading blades and the road resurfaced, additional sand and clay being added as needed. The road is then rolled with a steam roller.

Sand-clay roads are not well adapted to wet climates. After six or seven weeks of rain with cool weather, such as Columbia experiences, the sand-clay roads get into pretty bad condition. However, they recover rapidly from damage by rain, drying out very quickly in the sun.

The WEEK'S NEWS

\$2,000,000 Road Bond Issue for Cook County, Ill.—Paving Work in Galveston and Springfield, O.—New Waterworks Improvements in Billings, Mont., Centralia, Wash., Gilbert, Minn.—Electric Developments in New York State—Fire Losses in Illinois Cities—New Motor Apparatus—Commission Victories and Defeats in Many Cities—New Charters—The "Jitney" Puzzles Many Cities—Public Service Commission Changes Wanted in Pennsylvania and Missouri.

ROADS AND PAVEMENTS

\$2,000,000 for Good Roads.

Chicago, Ill.—The county board has passed resolutions authorizing a \$2,000,000 bond issue for building good roads in Cook county. The proposition under which the bonds were voted by the board was voted upon at the election on November 3, 1914. The resolution provides for the issuing of \$200,000 of the bonds each year for ten years. Under the Tice good roads law the state will appropriate an equal amount. This will give Cook county \$400,000 to be expended for good roads this year if the bond issue is held to be legal by the courts. The plan is to use the funds from this bond issue in completing the four concrete roads begun with the state aid funds. Funds from this bond issue will not be available until some time in August, according to estimates by the county superintendent of highways. It will be necessary to test the validity of the bond issue in the Supreme Court before it will be possible to sell the bonds. The point which is to be decided through a friendly suit brought by the Associated Good Roads Association is whether it was necessary the bond proposition receive a favorable vote by "a majority of all the votes cast," or receive a favorable vote from "a majority of the votes cast on the proposition." The vote on the bond issue on November 3, 1914, was: Yes, 220,687; no, 152,795.

Galveston Paving Work.

Galveston, Tex.—465,834.16 square yards of permanent street paving, or 16.86 miles, have been completed. With paving already being constructed and that now under contract, there are 469,171.16 square yards, or 16.975 miles. According to the city engineer's records the 16,570 miles on November 1, 1914, was divided as follows: Total brick paving, 11.853 miles; total concrete paving, 2.499 miles; total wood block paving, 2.218 miles.

Another Road Building School.

Knoxville, Tenn.—A school for road builders will be conducted February 23 to 26, under the auspices of the University of Tennessee. Instruction will be given by members of the university engineering faculty, assisted by a corps of government and state highway experts. No fees will be required. The school will be formally opened with an address by Dr. Brown Ayres, president of the University of Tennessee. Addresses on engineering topics of interest will then be delivered by the following experts: "Earth and Natural Soil Roads," by Dr. L. I. Hewes, United States senior highway engineer; "Suggestions for Macadam Road Construction," by Dr. L. I. Hewes; "Cooperation Essential to Building Public Roads," by M. V. Richards, commissioner of Southern Railway; "Planting Along the Highway," by Prof. C. A. Keffer, director of extension department of the University of Tennessee; "The Present Situation of the Good Roads Movement in Tennessee," W. E. Meyer, president of the Tennessee Highway Association. A discussion will be led by Capt. W. E. McElwee, of Rockwood. Speakers and topics for the second day are: "Highway Economics and Maintenance," Dr. L. I. Hewes; "Materials Suitable for Highway Bridge Construction," Clifford Older, bridge engineer of Springfield, Ill.; "Highway Management," Dr. L. I. Hewes; "Reinforced Concrete Bridges as Designed by the Illinois Highway Commission," Clifford Older; "Use of Refined Tar in Building Roads," Philip Sharples, Boston. Discussions will be led by Dr. H. A. Morgan, dean of the college of agriculture, University of Tennessee; F. G. Phillips, of

Sevierville; J. N. Fisher, of Morristown. Among those who will speak, with themes for the third day are: "Engineering Supervision of Road Construction," W. S. Keller, state highway engineer of Alabama; "Concrete Highway," Louis A. Young, of Philadelphia; "Common Errors of Road Builders," W. S. Keller; "Culverts and Bridges," Louis A. Young; "The Manufacture and Uses of Pure Iron," G. F. Ahlbrandt, of Middletown, Ohio. Discussions are scheduled under the supervision of Robert Oliver, of Maryville; Prof. J. A. Switzer, hydraulic engineer, University of Tennessee; Henry P. Brown, of Greenville; William Park, civil engineer, of Knoxville. A. D. Williams, chief road engineer, of West Virginia, has been secured to speak on the final day's session. Mr. Williams has chosen as his themes: "Grades and Excavations, the Determining Factors" and "Use of Convict Labor on Highways." A discussion will be led by Judge R. A. Brown.

State Must Pay Turnpike Damages.

Media, Pa.—The burden of responsibility for damages resulting from the abolition of toll roads in the state has been shifted from the county to the state by the Delaware County Court, when Judge Johnson handed down a sweeping decision in appeals from awards of juries of view appointed by the Bucks County Courts in condemnation proceedings against the Doylestown & Danborough and Danborough & Plumsteadville Turnpike Companies, which appeals were heard in the courts of this county on a change of venue. W. I. Schaffer, attorney for the county, raised the point that since the passage of the Sproul good roads act a county cannot be called upon to pay damages for the condemnation of a turnpike, and that although the county may have condemned the road the damages cannot be recovered from the county, but are payable by the state. The judge sustained this contention and directed the jury to find a verdict in favor of Bucks county. His decision will save Bucks county alone upward of \$100,000 damages. The decision will have far-reaching effect throughout the state, and on the state's general policy of freeing the roads from toll. As a result of this all the turnpikes leading out of Philadelphia into Delaware, Chester and Montgomery counties can be freed without expense to the counties provided they are part of the state system of highways.

Year's Street Work in Springfield, O.

Springfield, O.—In the annual report of Chief Engineer M. J. Bahin filed with City Manager Ashburner it is estimated that with an area of 7,156 acres, or 11.12 square miles, the city has a total of 163.76 miles of streets, as shown by the report. Of the total, 101.64 miles are classed as improved and 62.12 miles unimproved. The total cost of the paved streets (not including macadam or gravel) is listed at \$1,211,384.05. Sections of 11 streets were paved during the year for a total yardage of 78,476, at a cost of \$157,319.28. Six other paving projects having a yardage of 27,100 and with a cost completed of \$68,484.83, are under construction but were not completed at the end of the year. The average cost of the paving, excavations included, was \$1.85 per square yard for brick, \$1.97 per square yard for sheet asphalt, and \$1.73 per square yard for asphaltic concrete, the three kinds of paving material used. In addition 17,660 yards of street were macadamized at a cost of \$11,317.77, and 1,756 yards of street were graveled. There was also laid during the year 107,009 square feet of cement sidewalks and 14,488 lineal feet of cement curbs and gutters, at a total cost of \$17,856.05. The total cost of cleaning streets for the year was \$24,897.72. The business area,

comprising 42,000 square yards of paved streets, was swept and flushed daily at an average cost of 96 cents per 1,000 square yards. The residence area, comprising 509,000 square yards of paving, swept twice a week and the debris hauled, at an average cost of 51 cents per 1,000 square yards. There are 92.31 miles of cement sidewalks, representing a cost of \$311,790.90, and over 62 miles of cement curbs and gutters in the city.

Lincoln Highway Emblems Copyrighted.

Washington, D. C.—The application of the Lincoln Highway Association of Detroit, Mich., for a copyright of its name and road marker has been granted and the exclusive use of them secured. These are already fully protected in each of the states crossed by the highway.

SEWERAGE AND SANITATION

Cost of Rat-proofing Mobile.

Mobile, Ala.—Commissioner Pat J. Lyons has reported to the city commission that the rat-proofing campaign of last year cost the city of Mobile \$8,500, but that on January 1 the cost had been cut down to almost nothing. He said that the state contributed one man at \$75 per month, but the last month that he was in service the city paid his salary.

Experimental Electro-Chemical Sewage Plant.

Orange, N. J.—Following a conference with the Orange City Commission James W. Clark, inventor, and William B. Fuller, consulting engineer, received permission to erect a plant to demonstrate the electrochemical system of disposal at the outlet of the Orange trunk sewer. They claimed that the new system would prove more practical than the Imhoff method as a more satisfactory effluent and sludge could be obtained at a lower cost. Mr. Fuller explained that with the Clark process the sewage is first treated with lime and then with another chemical, which he could not divulge at this time. The chemically charged sewage is then passed through a disintegrating chamber and later treated electrolytically. After this treatment, the effluent is 100 per cent pure and the sludge is absolutely non-putrescible. One of the important advantages emphasized by the engineer was the fact that there is no loss of "head" as a drop of several feet is not necessary.

Typhoid in Portland, Me., Not Due to Water.

Portland, Me.—A denial of the allegations that the typhoid fever epidemic which raised the death rate from this disease in Portland during 1914 was due to pollution of the water supply has been made in the annual report of James M. Caird to the trustees of the Portland water district. That the milk supply and the flies were responsible for the conditions existing in Portland during last August, September and October is the statement of Mr. Caird. Mr. Caird, in his report, shows that 6,345 samples of water were examined for *B. Coli communis* and 2,538 for bacteria. In the work of milk examination the report says that 925 samples of milk were examined for *B. Coli* and 185 for bacteria. Mr. Caird says that the hypochlorite plant at the intake at Sebago Lake has proved itself to be of inestimable value. He says there are several causes for the possibility of the water becoming polluted at the intake, and classifies them as follows: Surface waste, Sebago village drainage, drainage from Sticky River and the possibility of pollution from steamers and pleasure boats during the vacation season. By the purchase of land and removal of buildings in the vicinity of the intake the possibility of pollution from this source has been reduced to a minimum, and arrangements are now being made to take care of the possible pollution from Sebago village, probably by the installation of a hypochlorite plant. The greatest danger of pollution from steamers and pleasure craft comes during the summer months. Mr. Caird points out that flies were at their maximum during August, when typhoid also reached its greatest figure. He also says that had the water supply been in any way connected with the epidemic the disease would have been present in all sections of the district. This, however, was not true. The milk supply for Portland, says Mr. Caird in his report, is far from satisfactory.

WATER SUPPLY

City Now Owns Waterworks.

Billings, Mont.—The waterworks system in Billings is now owned by the municipality and is managed by a board of three commissioners appointed by the mayor and confirmed by the council. Formal transfer of the plant from the Billings Water Company has been made, and full provision for taking it over was made at the last meeting of the council. Directly representing the commissioners will be a superintendent at \$200 a month and a cashier at \$125. Acquisition of the waterworks system resulted from the expiration of a twenty-year franchise held by the company and upon payment of \$315,000, for which a bond issue of \$450,000 was authorized at a special election. The balance of \$135,000 will be used for the construction of a purification plant and for extensions of water mains. The acquisition marks the end of a thirty-year fight for municipal ownership of the works.

New Reservoir Accepted.

Centralia, Wash.—Centralia's new \$27,000 reservoir, located just east of the city, has been accepted from the contractors by the city commission on recommendation of the city engineer. The last payment of \$7,020 will be held up for thirty days, however, to guard the city against any loss from claims against the contractors. The new reservoir has been in use for three weeks and is satisfactory. Centralia now has three reservoirs capable of holding enough water to supply the city for thirty days in case of an accident to the gravity pipe line.

Work Begins on New Filtration Plant.

Gilbert, Minn.—Actual work on the new \$30,000 filtration plant has begun under the supervision of G. A. Arnolds, who will be the engineer on the grounds for Kimball & Fay, Chisholm, consulting engineers for the village. The filtration plant will be similar to the one at Chisholm but have only one-half of its capacity. It will have two lower service pumps of 250 horsepower, electrically driven, to pump the water in from Ely Lake to the clear well and two similar high service pumps to pump the water from the clear well into the filtration tank. The plant will have an intake at a depth of 30 feet.

Rains Bring Year's Supply

San Diego, Cal.—Water to the extent of 742,000,000 gallons has been added to the city's water supply by the recent rains and water has been flowing into the Lower Otay reservoir at the rate of 27,000,000 gallons a day and into the Morena reservoir at a greater rate. The two big reservoirs and the smaller one at Upper Otay combined now hold nearly five billion gallons of water. The runoff into the city impounding system will amount, it is said, to fully a year's supply, and the rainy season is just fairly begun. Comparatively little of the city's supply is being drawn upon now, as the excess waters of the Cuyamaca Water Company are being turned into the city distributing system and water from this source will be available for some time.

City Wins in Water Case.

Leavenworth, Kan.—Mayor Crancer has received from the state utilities board a complete copy of the finding of the commission in the waterworks case. The commission finds for the city on almost all the important points involved and fixes a rate of 28 cents per thousand gallons for domestic consumption where the consumer used over 1,880 gallons per month and not over 10,000 gallons a month. The commission condemns the practice of forcing consumers to use a particular high-priced meter when others would do. It holds that extensions must be made where the service guarantees 10 per cent of the cost of installing the service mains. It fixes a sliding rate for metered water ranging from 28 cents to 6 cents per thousand gallons, according to the quantity used. The commission finds that the actual physical valuation of the plant is \$497,108.15, to which it allows 7½ per cent to be added for going value, which brings the valuation up to \$534,-

391.26. It finds that 6 per cent is a reasonable rate of return on this investment and adds that were it not for the fact that a considerable portion of the water business of the city of Leavenworth has not been solicited and developed, as it should have been, a higher rate of return might have been allowed.

The scale of metered rates as fixed by the commission is as follows:

To 1,880 gallons per month, 50 cents flat—the minimum rate. The first 10,000 gallons or any part thereof over 1,880 gallons, 28 cents per 1,000 gallons; the second 10,000 gallons, 25 cents per 1,000 gallons; the second 20,000 gallons, 22 cents per 1,000; the second 40,000 gallons, 19 cents per 1,000; the second 80,000 gallons, 17 cents per 1,000; the second 160,000 gallons, 15 cents per 1,000; the second 320,000 gallons, 13 cents per 1,000; the second 640,000 gallons, 11 cents per 1,000; the second 1,280,000 gallons, 10 cents per 1,000; the second 2,560,000 gallons, 9 cents per 1,000; the second 5,120,000 gallons, 8 cents per 1,000; the second 10,240,000 gallons, 7 cents per 1,000. All usages in excess of 20,480,000 gallons per month, 6 cents per 1,000 gallons.

STREET LIGHTING AND POWER

Need Council's Permission to Use Streets.

Cincinnati, O.—The three judges of the Court of Appeals have handed down an opinion reversing the judgment of Common Pleas Judge Gorman, who recently refused the city an injunction to enjoin the Diamond Light Company, rival of the Union Gas & Electric Company, from using certain streets and alleys in which to lay conduits for electric feed wires. It was contended by the city and the Union Company that the Diamond Company, which had the authority of abutting property owners to lay wires in the public ways in question, had no legal right to use the streets and alleys without consent of the city council. The Court of Appeals says: "The determination of whether consent for the opening of streets and alleys should not be given is vested in the council of the city. If the action of the council in refusing to grant consent to a company to lay wires and construct conduits for electric lighting results to the disadvantage of the citizens and property owners of the community, that is a matter that can be rectified by a change in the personnel of such council and public officials." The Diamond Light Company will carry the case to the Supreme Court of the state.

New Lighting Plant to Furnish Many Towns.

Waterloo, N. Y.—The foundation has been completed and brick work has now begun on the big power plant of the Tracey Development Company in South Waterloo, which is to furnish electric power for a large part of western New York, according to the plans of the company announced several months ago. The plant is to cost about \$100,000. The current will be transmitted to Seneca Falls, Auburn, Geneva, Phelps, Lyons, Clyde, Palmyra, Newark and other towns. The construction is in charge of Grant, Smith Company and Locher, which corporation also has charge of barge canal contracts here.

Public Utilities of Eugene, Ore.

Eugene, Ore.—According to the report of the water board filed with the city council the net earnings of the municipal electric power plant and lighting system from June 10, 1914, to December 10, 1914, amounted to \$7,242.54. The gross earnings for that period were \$30,222.47, out of which was paid operating expenses and interest on bonded indebtedness to the amount of \$15,034.73. In addition the value of the electrical properties was increased by new construction and extension to the amount of \$7,945.20, which leaves a net balance on hand of \$7,242.54. The gross revenue for the entire year shows a total of \$63,841.68 as against \$56,928.73 for 1913, an increase of \$6,912.95. During the same period the water department's net earnings amounted to \$6,404.62. Gross receipts from the water department amounted to \$24,415.73, out of which was paid operating expenses, and interest on bonded indebtedness to the amount of \$15,983.86, while the system was increased by new construction and extensions amounting to \$2,027.25, leaving a net balance on hand of \$6,404.62. Net revenues from both water and light departments, according to the report amount to \$13,647.16. The council

ordered the report placed on file for future consideration. The statement shows that the cost of the power plant and distributing system to be \$317,219.57, while the cost of the water plant and filter system was \$212,225.86, making a grand total of \$529,445.43. The total number of active accounts in the electrical department is 1,671. Before the municipal utility first entered the commercial field about three years ago, the citizens of Eugene were paying a maximum rate of 15c per kilowatt hour for lighting service, and when the municipal utility was ready for commercial service, the maximum rate for lighting service was set at 9c per kilowatt hour. Effective with the issuance of the bills September 1, 1914 the water board announced a further reduction in lighting rates from 9c maximum per kilowatt hour to 8c maximum per kilowatt hour, and power service from 5c per kilowatt hour to 4½c per kilowatt hour.

New Transmission Line in Operation.

Massena, N. Y.—The 45-mile transmission cable to carry 85,000 horsepower of electrical energy from Cedar Rapids, in the St. Lawrence River, past Cornwall to Massena, N. Y., is now in operation. There are six cables, forming two circuits, each cable being aluminum, 1 inch in diameter, on a steel core.

FIRE AND POLICE

Rome Helps Utica in Fire.

Rome, N. Y.—In a \$100,000 early morning fire the Rome fire department called for outside aid. Mayor H. C. Midlam was on the scene of the fire soon after it broke out, and Utica and Oneida were called on to help—the Oneida call being later withdrawn. Ten Utica firemen, under Deputy Chief Frank Breitenberg, with steamer No. 4 and hose cart No. 4 with 1,550 feet of hose arrived 40 minutes after the call. The Rome department had eleven steamers and about 7,000 feet of hose in use.

Fire Losses Decrease in Illinois Cities.

Springfield, Ill.—The fourth annual report of State Fire Marshal Bennett shows that all but four of the Illinois cities with populations of 15,000 or over show a decrease in fire loss in 1914 over 1913. Chicago leads with \$1,023,495 decrease, while Quincy is second with a decrease of \$406,464. A total of 11,605 fires were reported to the state fire marshal's office during the year 1914, as compared to 8,432 for the year 1913. This increased number of fires represents, more than any other one thing, the increased efficiency of those officers whose duty it is to report fires to the fire marshal's department, rather than any material increase of the fire loss in the state. The only large city in Illinois which shows an increase of any consequence is Decatur, which has an increase of over a half million dollars. This was occasioned by the burning of the Powers Block, which was an especially stubborn fire to fight. The following is a comparative statement of the fire losses for the years 1913 and 1914 in those cities in Illinois having a population of 15,000 or more:

	1913.	1914.	Decrease.
Chicago	\$5,600,000	\$4,567,495	\$1,023,495
Quincy	504,000	97,536	406,464
Rock Island	342,000	30,206	311,794
East St. Louis	637,540	440,443	197,100
Springfield	276,136	108,359	167,777
Peoria	407,987	356,657	51,330
Freeport	53,808	8,609	45,199
Aurora	51,973	30,306	21,667
Rockford	59,464	17,784	41,679
Elgin	45,000	24,100	20,900
Belleville	32,000	16,000	16,000
Champaign	47,338	31,935	15,403
Moline	35,000	23,658	11,342
Bloomington	26,177	19,056	7,121
Oak Park	31,041	26,000	5,041
Streator	19,621	14,778	4,842
Kankakee	10,490	6,745	3,745
Danville	82,000	79,879	2,121
Total decrease			\$2,347,978
	1913.	1914.	Increase.
Waukegan	\$18,000	\$21,000	\$3,000
Joliet	11,557	23,902	12,343
Evanston	24,000	68,751	44,751
Decatur	65,000	626,129	561,629
Total increase in four cities			\$621,723

Taking the entire 22 cities together, being all of the cities in the state with a population of 15,000 or more, there

is a total decrease in the fire loss amounting to \$1,726,255. During the year 1913 there were 387 deaths by fire, and during the year 1914, 287, a total saving in life of an even hundred. The state fire marshal attributes the saving to the system of inspection carried on by the department with the aid of the local fire departments.

MOTOR VEHICLES

New Apparatus Arrives.

Elizabeth, N. J.—The new motor equipment for the fire department has arrived here and is now at fire headquarters. The equipment includes a triple combination pumping engine, hose and chemical apparatus for Engine Company No. 5 and a combination pumping engine and hose wagon and a combination chemical and hose wagon for Engine Company No. 3. The new machines are to be tested before acceptance.

Low Upkeep Cost of Motor Apparatus.

Williamsport, Pa.—Councilman Perry S. Harman, superintendent of public safety, has made some interesting comparisons between the cost of maintenance of automobile chemical and hose truck and the horse-driven engine at No. 1 Engine house. During the last year the motor-driven apparatus responded to 99 fires, and the engine to 69 fires and went into active service at only three fires. The cost of the fire engine and horses for upkeep aggregated \$312.64 for the year. This cost is divided as follows: Feed and hay, \$272.89; horse shoeing, \$31.75; coal, eight dollars, making an average cost of approximately 85 cents a day. The cost of maintenance for the automobile chemical totalled \$48.10, divided as follows: Gasoline, \$25.20; oil, \$9; repairs, \$13.90, an average of about 13 cents a day.

Must Cities Pay Auto Licenses?

Los Angeles, Cal.—The question of the liability of the city to pay taxes to the state on its motor vehicles used in the public service is puzzling the city officials. Before the motor vehicle act of 1913 went into effect, this question was taken up by the Los Angeles city attorney with Purchasing Agent Baker. In the interval correspondence of considerable volume, touching on this question, has passed between the city attorney's office and the attorney-general of California. The city attorney holds that the provisions of the act do not apply to Los Angeles. The attorney-general holds that they do apply. The city attorney suggests that the city formally decline to pay the tax, and that he be instructed to consult with the attorney-general, to the end that a speedy and amicable conclusion may be reached through the courts. The council consented to this. This same question has been puzzling Pomona city officials for some time. It has been held that police and fire department autos are exempt from tax, while park and street department machines are subject to assessment.

GOVERNMENT AND FINANCE

Pole and Wire Tax Valid.

Dallas, Tex.—Holding the "pole and wire tax ordinance" of the city of Dallas to be valid and constitutional, the Fifth Court of Civil Appeals here handed down an opinion affirming the judgment of the Fourteenth District Court in the city's suit against the Southwestern Telegraph and Telephone Company, decided last winter. The jury verdict in the trial court awarded to the city \$15,348 sued for as a tax of \$2 per pole on 7,674 poles of the defendant company in the city of Dallas, but denied to the city an additional \$11,385 as a tax of 25 cents per mile on wires laid underground in the city. Justice Rasbury ruled that the levy of the pole tax was not in any sense a violation of contract rights or of vested rights of the telephone company, because, under the state constitution, the city had the right to reserve future control to itself in all agreements made with such corporations. He held the city has the power, under its charter to make charges for the use of the streets of the city. In fact, he ruled the provisions of the city charter could not conceivably be much wider in that respect.

Then, having the power to make the charges, the determination of the amount of the charges would be as much a matter of regulation as would be the placing or the height of the poles of the company, and it was entirely within the city's power to decide. As to the contention that the ordinance was class legislation and discriminatory, Judge Rasbury held that it was in no sense a denial of equal protection of the law to the appellant. He defined the term class legislation and held that there was no lack of equality and uniformity between appellant and other similar concerns similarly occupying the streets of Dallas. He pointed out that the record showed that there is another telephone company which pays a 4 per cent. gross receipts tax, and is, therefore, exempted, and the street railway companies having no holes on the streets pay paving costs and other substantial taxes, and, therefore, are exempted. One of the two final contentions taken up was that the city could not tax its poles because it was doing a long-distance service. There had been no attempt to oust the company or to interfere with such service, he held, and therefore, that contention had no effect. It is expected that attorneys for the telephone company will immediately begin work on an appeal of the case to the Supreme Court of Texas.

Michigan Towns Defeat Commission Plan.

Coldwater, Mich.—A proposition to adopt the commission form of government for Coldwater has been defeated by a majority of 71 votes at a special election.

Benton Harbor, Mich.—Benton Harbor at a special election refused to abandon the old system of government for the commission and city manager plan, and by a vote of 859 to 761 turned down the new charter. A little more than half the city's normal vote was registered.

New Charter for White Plains, N. Y.

White Plains, N. Y.—White Plains will be a city next year if the charter is passed by the legislature and signed by Governor Whitman. The board of trustees has unanimously approved and agreed with the citizens' charter committee not to submit the whole instrument to a general referendum but only to submit two sections in dispute at a special election to be held in June. The questions which will be voted on at the special election will be: (1) Shall the council consist of 12 members, 2 elected from each ward, or shall it consist of 6 members elected at large; (2) shall the elections be held under the general law, with nomination by petition, partisan primaries and party emblems, or under a special law, with nomination by petition only and no party emblem.

More Commission Elections.

Chicago Heights, Ill.—At the special election held to decide on the adoption of the commission form of government the new form was defeated by a vote of 1,143 to 630.

Joliet, Ill.—After a campaign of education by a number of civic bodies and a hard fight, the commission form won by a vote of 5,456 to 5,049. After the proposition had been defeated at two former elections, it was carried this time, in spite of a men's majority vote against it. The vote stood: Men—yes, 2,948; no, 3,123. Women—yes, 2,508; no, 1,926.

Monmouth, Ill.—The commission form of government was rejected by the people of Monmouth at the special election by a majority of 438. The men rejected the form by a substantial majority of 534. The women voters thought better of the proposition and the vote stood 349 to 253 in favor of the form. The city administration did not approve of the plan.

Hoboken, N. J.—After two unsuccessful attempts, the advocates of commission government in Hoboken won at the special election by a majority of three votes. The total number of votes was 7,137, of which 3,570 were for and 3,567 against the change. Corporation Attorney John J. Fallon said that, in his opinion, the ballots cast might be declared invalid because City Clerk James H. Londrigan, of Hoboken, had no time to print on the ballots a clause from a law passed by the New Jersey legislature and signed by Governor Fielder the night previous. There has

been great opposition to commission government in Hoboken, and its opponents intended to contest the election because of the ambiguous wording of the Walsh bill in specifying whether 30 per cent of the voters or 30 per cent of the total population of Hoboken must vote to make the election valid. Assemblyman Martin introduced a bill specifying 30 per cent of the voters. It was unanimously passed by the House and the Senate and signed by Governor Fielder in thirty minutes.

Sells \$1,000,000 Bond Issue.

Paterson, N. J.—Paterson's \$1,000,000 bond issue has been sold to George B. Gibbons & Co., of New York City, at the highest bid, of 102.65. The premium will therefore be \$26,500. This is the largest single bond issue that has ever been made by Paterson. The money will be used to pay part of Paterson's share of the cost of the Passaic Valley trunk sewer.

West Virginia Cities Want New Charters.

Charleston, W. Va.—Application to the legislature for a new charter or amendments to an existing charter has been made by a number of cities of the state. More than twenty charter bills have already been introduced. There is widespread sentiment among the legislators in favor of some sort of a municipal law permitting the residents of cities and towns to prepare and amend their own charters. A bill is before the senate proposing to empower cities and towns of more than 2,000 population to amend, add to or replace their charters. Many of the charter bills are extremely long. The Charleston charter bill, for instance, covered 103 printed pages. The Wheeling charter bill is even longer, and probably will consist of 125 pages. Among the charter bills which have been introduced up to the present time are those relating to the following: Wheeling, Charleston, Follansbee, McMechen, Cameron, Wellsburg, Bluefield, Elkins, Mannington, Huntington, Fairmont, Williamson, Martinsburg, Hinton, Charles Town, Princeton, Shinnston, Pennsboro and Philippi.

Governor Will Not Oust Mayors.

Columbus, O.—Governor Willis has announced that he will not take any action on the complaints made to him against Mayor Keller. In a formal statement explaining his decision, Governor Willis said that he would take a similar attitude in regard to mayors of other municipalities concerning whom objections have been voiced. Only positive danger to the city of pillage, disorder, or misrule would justify the governor in exercising his power to remove the mayor of a municipality, Governor Willis said. Otherwise the whole theory of civic responsibility would be upset, he said, and the right of municipalities to govern themselves would be invaded. Governor Willis pointed out that the complainants have their remedy in the courts, where the accused officials would have full right of trial. This remedy was provided in the statute passed at the 1912 session in compliance with the constitutional amendment adopted by the vote of the people to facilitate the removal of objectionable officials.

Recall Petitions Filed.

Superior, Wis.—Thirty petitions carrying about 1,200 signatures have been filed with City Clerk R. E. McKeague demanding the recall of Mayor J. S. Konkell. Mayor Konkell announced that he will retain legal counsel to fight the recall proceedings on the basis that the petitions had not been secured in a "reasonable time" and had not been properly circulated. The law applying to commission governed cities requires the signatures to the recall of 25 per cent of the total vote for governor at the last regular election. The general recall law applying in all cities in the state provides that one-third of the votes cast for mayor at the last election be secured and that they be filed with the city clerk within thirty days. In the commission governed city law no time limit is prescribed. The general law was passed after the commission law and should there-

fore apply to the present case, according to the mayor. He is of the opinion that where a time limit is not prescribed the courts will hold that the limit prescribed in the other law should be applied. The grounds on which the recallers demand the removal of Mayor Konkell are substantially the same as those contained in the petitions filed on the occasion of the first recall movement a year ago: Incompetence, favoritism and neglect to enforce laws.

RAPID TRANSIT

The Jitney in Many Cities.

Denver, Colo.—The city council has passed an ordinance regulating the operation of jitney busses. All such vehicles must have a franchise from the city and county under penalty, on conviction, of a fine of \$100 to \$300 or imprisonment for not exceeding 90 days or both—each trip to be considered a separate offence.

Austin, Tex.—Bills have been introduced into the legislature to regulate jitney cars in Texas cities by making the drivers and owners of these cars responsible for any accidents that may occur. The law provides that they shall pay a license from 1c. to \$50, whatever the city may prescribe. It also provides that they shall give a bond of \$5,000, made payable to the mayor of the city, to make good any accident.

Toledo, O.—The first regularly scheduled jitney bus has made its appearance in Toledo. The car will hold twelve passengers.

New Orleans, La.—The jitney has invaded this city in the shape of the Feitel Jitneymobile Co., which is to operate the automobiles on street car schedules and five-cent fares. At the outset three five-passenger and seven seven-passenger cars are to be used. Passengers will be taken on and off at the curb, and everyone will be assured a seat. During school-going hours, school children will pay a special three-cent fare.

Oklahoma City, Okla.—Oklahoma City's commissioners, in an emergency measure, have put the "jitney" out of business just as it was getting started. Any violation of the rules in the ordinance subjects the bus owner to a fine of \$100. Busses are prohibited from operating their cars "longitudinally" on any street occupied by a street railway. Licenses are made expensive and the policy of insurance is heavy. The ordinance carries an emergency clause and went into effect at once upon its passage.

Tulsa, Okla.—"If but five jitney cars are allowed to operate unlicensed and unregulated, they can rob us of all our earnings and eventually force us into bankruptcy," is what Charles H. Bosler, of Dayton, O., president of the Tulsa Street Railway Company, told the city commissioners in support of a proposed ordinance which would place a heavy tax and stringent regulations on "jitneys." The Tulsa Street Railway Company had an investment of \$500,000, according to Bosler, at Port Arthur, Tex., where the same company owns the street railway system. Jitney cars have reduced street car revenue almost to nothing. Bosler said in Tulsa they have also cut heavily into the revenue since their advent. At Enid, jitney cars are making themselves a menace to the street railway, also owned by the Bosler interests.

Indianapolis, Ind.—A "jitney" bus is now operating here, trying out a plan to establish a system of lines.

Louisville, Ky.—Louisville's first "jitney" busses have begun service. Three lines were started on an hourly schedule and three more lines are planning to start within the month. While the matter of the legality of the busses has been considered in an informal way, it is said, no definite steps have been taken as yet toward regulating such traffic. Licenses for "jitney" busses, it has been suggested, should prescribe the rate of fare, the tax to be paid, the route to be followed, and should permit busses to run only on such routes as would be of benefit to citizens. It is contended that the regulation should be as substantial as that of the Louisville Railway Company, providing for adequate and extensive service.

Oakland, Cal.—The city council is having a difficult struggle with the problem of the regulation of "jitney bus" traffic. Two ordinances are being considered—one a rather severe one drawn up by City Attorney Woolner and the other by Attorney J. W. Stetson, representing the "jitney" drivers. The operation of these busses is making finances tight for the car lines, and it is being considered whether the routes of the busses shall be restricted and whether they should be taxed.

Fort Worth, Tex.—Doubting their authority to act in other ways, the city commissioners will probably limit their regulation of "jitney" automobile traffic to enforcing orders to require liability insurance and limiting the number of passengers. Franchise taxation will probably have to be legislated by the state legislature.

MISCELLANEOUS

Want Public Service Commission Abolished.

Harrisburg, Pa.—Abolition of the public service commission and curtailment of the authority of the state officials in regard to water purification and sewage disposal projects were demanded at meetings of the Association of Pennsylvania Boroughs and the Municipal Home Rule League. T. F. Chrostwaite, Hanover, president of the association, and David L. Starr, Bellevue, president of the league, presided at the joint meeting, and sharp criticism was voiced against the act creating the commission and the body itself. The act was declared to violate the principles of home rule in regard to control of public utilities, and the commission's rules of practice were said to cause expense to complainants in forcing them to come to Harrisburg to attend hearings and to employ counsel and experts. It was also declared that the commission had erred in allowing "going value" to be considered in acting on cases. It was contended by several speakers that the county courts were the proper places for adjudication of the complaints which have been brought before the commission. Edward Duffy, McKees Rocks, and James Morris, Leechburg, charged that the commission did not take local conditions into account; T. F. Chrostwaite, Hanover, that the corporations with their greater resources had secured the best experts and that the commission failed to aid complainants.

Public Defender for Portland, Ore.

Portland, Ore.—The ordinance creating the office of public defender has been passed by the council. The mayor is authorized to make the appointment and already has a large number of applications on file. The position pays \$150 a month. The public defender is to act as counsel for worthy men and women brought before the Municipal Court who are unable to employ legal assistance.

Propose Uniform Traffic Laws.

Trenton, N. J.—Recommendations for a comprehensive system of traffic regulation throughout New Jersey are contained in a report submitted to Governor Fielder by the special committee appointed to investigate that subject. The report was accompanied by drafts of three bills to be introduced in the legislature and one minor amendment to the motor vehicle law. The primary object of the committee was to provide for a complete and efficient system of traffic regulation and its enforcement, and particularly to reconcile the conflicting provisions now existing in many municipalities. The general scheme proposed by the report is the repeal of all existing traffic ordinances, supplanting them by a general statute applicable to all municipalities. In its work of standardizing traffic regulation the committee made a careful study and comparison of local ordinances and traffic statutes, selecting the Newark ordinance as the basis for its comparative analysis. No provision has been inserted in the proposed legislation, except it has been tested in some part of the state and been proved workable. The committee making the report was composed of Commissioner Job H. Lippincott of the department of motor vehicles, President A. V. Hamburg

of the Newark Board of Trade, and Commissioner George B. LaBarre, director of public safety of Trenton. A number of hearings were given, at which municipal officials and any one interested were given full opportunity to present their views. Among the recommendations were:

- Repeal of existing municipal ordinances, except those applying to unique or purely local conditions, and the passage of an act applicable to the entire State.
- Right of way for pedestrians where houses are less than 100 feet apart.
- Assumption of risk by persons crossing streets at places other than crosswalks.
- Driver at intersections gives right of way to vehicles approaching from his right.
- Regulation of headlights.
- Mapping out of a main highway system and the adoption of a policy of traffic regulation.
- Prohibition of advertising signs by roadside.
- Fines of \$10 and \$20 for first and second offenses, respectively. Jail if fines are unpaid.

Hires Expert to End Unemployment.

Philadelphia, Pa.—Through the appointment of Joseph H. Willits, of the Wharton School of Commerce and Finance, of the University of Pennsylvania, by the department of public works, the city is preparing to anticipate the state-wide move for public employment bureaus, expected to become a law at the present session of the legislature. This city is to see the establishment of a city employment bureau, which will act in co-ordination with the municipal government.

New Public Utility Legislation.

Jefferson City, Mo.—Bills have been introduced into both branches of the legislature making numerous changes in the laws governing the state public service commission. Under these proposed laws stockyards are declared public utilities and their charges subject to regulation by the commission. One of the most important amendments contains what is known as the indeterminate permit statute similar to the one which has been in force in the states of Wisconsin, Massachusetts and Indiana for a number of years. This indeterminate permit statute gives the authority to any municipality in the state to condemn and take over any electric, gas, water or heating company when the city decides to operate such utility. Where a private company is operating such utility, the city is required to show public convenience and necessity to build a competing plant if it does not wish to condemn and purchase the same as provided under the provisions of the indeterminate permit act. This act provides that all franchises granted after its effective date shall be known as indeterminate permits and may be revoked by the commission on complaint and for good cause shown, giving the utility the right to review such order of revocation in the courts the same as orders of the public service commission are now reviewed. Any gas, electric, water or heating company that now has a franchise may surrender same on or before January 1, 1916, and accept an indeterminate permit in lieu thereof, by which such utility agrees that the city may condemn and take over the property of such utility on a valuation to be fixed by the state commission, with the right to review such valuation in the courts.

To Have Municipal Exhibit.

Newark, N. J.—Several city departments are preparing displays for the Newark Municipal Exhibition, which will be held at the City Hall from March 1 until March 7. The city plan commission has been the moving spirit in arranging for this exhibition. Speakers, some of whom are of national prominence, have been invited to talk on various problems of municipal government. The board of works will have charts showing its activities in recent years, such as a chart showing what the board has done in street cleaning and also how much it has received annually for that purpose. Others will show the progress in building sewers, laying pavements and extending water mains, with the appropriations available for each. The board of education will have maps and pictures of new schools and possibly a layout of a model school. The finance committee of the common council may have an exhibit showing the city debt on a large chart and for

what purposes the obligations have been incurred. Harland Bartholomew, secretary of the city plan commission; Carl Bannwart, secretary of the shade tree commission, and Ernest E. Easton, of the Newark Anti-Tuberculosis Association, compose a committee preparing the program for the exhibition.

Philadelphia's "Learn to Buy" Exhibit.

Philadelphia, Pa.—Fully 20,000 persons the first day visited the exhibition pavilion in the City Hall courtyard and learned from personal inspection of crooked scales, measures, milk bottles and oil cans how they have been robbed during past years by dishonest merchants. The "Learn to Buy" exhibit is being held under the auspices of the bureau of weights and measures. In the last ten months the bureau has confiscated 56,000 fraudulent weights and measures. Discussing the purpose of the exhibit, John Virdin, supervisor of the bureau, said that the bureau aims to teach the housewives how to stop the leakage in this period of high prices. The statisticians of the bureau figure that for the last thirty years the cost per capita through the lax system of inspecting weights and measures has been \$3 a year, or about \$4,000,000 altogether. Lectures are given daily at 3 and 8 o'clock. The exhibit will continue until April 1.

To Reduce Street Dangers.

New York, N. Y.—After conferring with President McAneny of the board of aldermen, Police Commissioner Woods and A. A. Anderson of the Museum of Public Safety, Mayor Mitchel has appointed a committee of citizens to co-operate with the police department in planning means for reducing hazard to life and limb in street traffic. The committee is composed of representatives of organizations interested in the subject, and Mr. Anderson is chairman. The other members are: Frederick Elliott, secretary of the Safety First Society; Robert Grier Cooke, of the Citizens' Street Traffic Committee; Daniel M. Bedell, chairman of the Aldermanic Committee on Thoroughfares; Dr. John W. Brannan, president of the board of trustees of Bellevue and Allied Hospitals; E. P. Goodrich, engineer in Borough President Marks' office; B. M. Falconer, of the Fifth Avenue Association, and Gen. George W. Wingate, of the Brooklyn Committee on Public Safety.

Work of the Pittsburgh Art Commission.

Pittsburgh, Pa.—The report of the work of the art commission, just issued, contains a brief account of the activities of local civic bodies previous to the creation of the art commission; the act of assembly creating the commission; an account of the commission's work since its appointment together with an explanation of its methods of considering submissions; a history of the agitation for the improvement of the Point district, and a copy of the E. H. Bennett report and drawings which the commission has recommended to the city council for adoption. The members of the commission serve the city without pay, and it is stated that the cost of the work amounts to about one-eighth of one per cent of the cost of the structures acted upon by it. The commission has undertaken a campaign of public education by illustrated lectures upon civic art which, it is thought, will prove of inestimable value. The report contains a number of interesting illustrations showing improvement in design under its direction. An excellent frontispiece shows the accepted design for the Schenley memorial fountain.

Legislation for Municipal Farms.

Topeka, Kan.—The Bird bill for municipal farm homes has been passed by a vote of 93 to 3. It provides that either counties or first class cities of more than 30,000 inhabitants may purchase land and establish a farm where prisoners will be put to work instead of being sentenced to jail. Prisoners are to be confined at the proposed farm home to work out any sentence or fine. The bill provides that a definite allowance in wages shall be made for each day of work, to be applied on the fine, or, in case a prisoner has a dependent family, part of the allowance may be contributed to their support. A special election may be held to vote on bonds for the purchase of a farm, or the question may be submitted at a general election.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Contributory Negligence—Speed of Automobile at Night.

West Construction Co. v. White.—Where a person drives an automobile at night in a dark place so fast that he cannot stop or avoid an obstruction within the distance lighted by his lamps, he is guilty of contributory negligence.—Supreme Court of Tennessee, 172 S. W. R., 301.

Injuries to Persons on Highways—Contributory Negligence.

Welch v. McGowan et al.—One driving along a public street which he sees is torn up must look out for obstructions and cannot recover where in broad daylight he drives onto a large gas pipe and is thrown out, though his attention be distracted by his horse getting his tail over the line.—Supreme Court of Missouri, 172 S. W. R., 18.

Use of Streets—Railroads—Overhead Construction.

Detamore et al. v. Hindley et al. City Commissioners (Chicago, Milwaukee & St. Paul R. R. Co., Interveners).—The use by a railroad of a street for the base of such supports as may be reasonably necessary to carry tracks over the street to obviate the danger of crossing at grade is not a surrender of any part of the street to the exclusive use of the railroad, where the part of the city involved is sparsely settled and many of the streets are ungraded.—Supreme Court of Washington, 145 P. R., 462.

Use of Streets—Negligence and Contributory Negligence.

Gladden v. City of Seattle.—Even though the plaintiff, starting to cross a street, was negligent in attempting to cross a wire which city employees were removing from poles and winding on a reel, the employees, knowing of his presence, were required to use a degree of care commensurate with the danger in which plaintiff had placed himself, and if by such care they could have avoided injury from the snapping of the wire, and failed to do so, their negligence was the proximate cause of the injury, rendering the city liable.—Supreme Court of Washington, 145 P. R., 418.

Use of Streets—Ordinance—Validity.

Brown v. Nichols et al.—A city ordinance which, in effect, prohibits one who owns and operates a machine shop from using the streets in bringing and taking traction engines and heavy vehicles to and from his shop, and thereby arbitrarily deprives him of an opportunity to carry on his business, is unreasonable and void.—Supreme Court of Kansas, 145 P. R., 561.

Public Wharves—"Public Highway."

Hafner Mfg. Co. v. City of St. Louis.—A public wharf on a navigable stream connected with public streets and in a sense an extension of the streets is a "public highway," and the right to the common use of it in the public and the rights of the city in and its duty toward it are governed by the laws governing public highways.—Supreme Court of Missouri, 172 S. W. R., 28.

Powers of Railroad Terminal Commission.

McCutcheon v. Terminal Station Commission of City of Buffalo et al.—Laws 1911, c. 842, creating the Buffalo terminal station commission, section 1 of which authorized the commission to adopt plans for the relief of the congested condition of the railroad terminals in Buffalo, and to require the railroads to make such changes in their tracks as might be necessary, and section 17 of which provided that the provisions of other acts, including the charter of Buffalo, so far as inconsistent with the Commission Act, should not apply to the rights and powers of the commission, when construed to effectuate its purpose, authorizes the commission to permit the laying of a track at grade along a city street, where that is necessary to carry out a plan adopted.—Supreme Court, equity term, Erie County, 100 N. Y. S. 850.

Street Grades—Changes—Damages.

Ludwigs et al. v. City of Walla Walla et al.—Where a city by ordinance has established a street and curb grade for both roadway and sidewalk, both the city and adjoining property owners were bound to conform to such grade, and the city after such conformity could not change the grade without payment of damages resulting to the property owners thereby.—Supreme Court of Washington, 145 P. R., 193.

Streets—Change of Grade—Right to Compensation.

Gas Engine & Power Co. et al. v. City of New York.—While a property owner, to be entitled to an award for damages for a change of grade, must show that there was a "graded street in existence" before a new grade was established, this means a street with an established grade, and not necessarily a street that has been physically constructed at the established grade.—Supreme Court, Appellate Division, First Department, 151 N. Y. S., 310.

Contract for Snow Removal—Construction.

Shaughnessy v. City of New York.—Where a contract for removal of snow from city streets provided that payment should be made on the basis of the snow and ice "actually removed," "subject to measurement," determined by "inside measurements * * * in every case," it contemplated that payment should be made according to actual measurement, and that the snow and ice should be heaped up, though the contract contained a schedule of the capacity of the vehicles most likely to be used and specified that they must be heaped up.—Supreme Court, Appellate Division, First Department, 150 N. Y. S. 805.

Contracts—Breach—Measure of Damages.

Rogers v. Oklahoma City.—Where a party furnishes meals in accordance with the terms of his contract, and is prevented by the city from further performing his contract, the measure of damages is the difference between the cost of production and the contract price from the date of the breach to the expiration of the period covered by the contract.—Supreme Court of Oklahoma, 145 P. R., 357.

Street Improvement—Guaranty Bond—Right to Attack Original Performance.

City of Ottumwa v. McCarthy Improvement Co. et al.—Where a contractor for street paving, under a contract providing that the improvement was to be made under the supervision and to the satisfaction of the city engineer, gave two bonds, one for faithful performance of the work according to the plans and specifications, and the other guaranteeing the improvement for seven years, in an action on the guaranty bond, the city, after having accepted the improvement, may attack the performance as not being in conformity with the plans and specifications, though ordinarily it could not be done if only the first bond had been given.—Supreme Court of Iowa, 150 N. W. R., 586.

Police Officers—Proceeding for Removal—"Suspension"—"Removal."

State ex rel. Wendling v. Board of Police and Fire Commissioners of La Crosse.—Statutes 1913, sections 959-45, provides that in cities of a certain class policemen shall be subject to suspension for cause by the chief or by the board of police and fire commissioners, and if by the chief he shall report it with the cause thereof to the board, which shall examine the charges and reinstate, suspend, or remove the policeman; that any qualified elector may also file written charges to be investigated by the board in the same manner, pending which the policeman may be suspended. Held, that the board had power to suspend on its own initiative summarily and without filing charges, but removal could not be made without written charges filed by the chief of police or some elector, and the board could not make charges of its own accord and proceed with a hearing thereon; the statute distinguishing between suspension and removal, "suspension" being an ad interim stoppage or arrest of official power and pay, and "removal" terminating wholly the incumbency of the office or employment.—Supreme Court of Wisconsin, 150 N. W. R., 493.

Local Improvement—Assessment.

Vincent et al. v. City of South Bend.—An assessment for a local improvement, though greatly in excess of the estimated cost, is not void, where the assessment did not exceed the benefits and was no more than the bona fide cost of the improvement; it appearing that the improvement was more expensive than expected, owing to the refusal of the federal government to assist, as had been expected.—Supreme Court of Washington, 145 P. R., 452.

Dedication—Public Use—Evidence.

City of Norfolk v. Southern Ry. Co.—In ejectment, where in a city sought to recover against lessees on the ground that the leases were ultra vires in that the property leased was held by the city, the lessor, in trust for the public, and hence could not be leased for railroad purposes, evidence held insufficient to show any dedication of the land to a public use, where it appeared that for more than 100 years the property had been used for purposes other than that for which it was claimed it had been dedicated, without any objection being made by the city or its inhabitants.—Supreme Court of Appeals of Virginia, 83 S. E. R., 1085.

Streets—Acquisition of Fee—Condemnation.

In re Ely Avenue in City of New York.—Where a street has been used as such for thirty or forty years, and for twenty years the city has had exclusive control of it for all street purposes, without the assertion of any claim of ownership except in subordination to the public easement, an application to condemn such parts as had not previously been acquired in fee, to which no person had made any claim, should not be granted, especially where the real purpose was to use the street for an elevated railroad.—Supreme Court, Special Term, Kings County, 150 N. Y. S., 698.

Obstructions in Streets—Frightening Animals.

Tanner v. Culpeper Const. Co., et al.—A municipal corporation or a contractor improving its streets is not liable for injuries resulting from the frightening of a horse at a steam roller, which was being used by the city or the contractor in the improvement of the street, or was placed on one side of the street during the course of its improvement, provided it was not left there an unreasonable time.—Supreme Court of Appeals of Virginia, 83 S. E. R., 1052.

Contracts—Referee's Decision.

Hughes v. Model Stoker Co.—Where a city inspector of buildings was made by an improvement contract the absolute judge of the conformity to specifications of a contractor's work, his decision against the quality of three furnaces furnished by a subcontractor, who was bound by the provisions of the principal contract, is conclusive against the subcontractor in the absence of fraud.—Court of Appeals of Maryland, 92 A. R., 845.

Street Improvements—Resolution—Sufficiency.

Coatsworth Lumber Co. v. Owen et al.—A resolution declaring it necessary to pave a street with first-class vitrified paving brick or blocks, and to curb the same with first-class concrete curbing, according to specifications on file with the city clerk, filed by the city engineer, makes by reference the specifications a part of the resolution, and is sufficient under Revised Statutes 1909, sections 9254 and 9255, specifying the manner of making street improvements.—St. Louis Court of Appeals, Missouri, 172 S. W. R., 436.

Defective Streets—Injuries to Pedestrians—Contributory Negligence.

Werthner et al. v. Girard Avenue Farmers' Market.—Where plaintiff, in the daytime, with full knowledge of the defective and rounded character of a curbing of a street, chose to walk on it to avoid mud and water that had gathered over certain sunken bricks in the pavement, and in doing so fell and was injured, when it was possible for her to have taken a few steps to either side of the depression and pass in safety, she was guilty of contributory negligence, precluding a recovery against the owner of the adjoining property.—Circuit Court of Appeals, Third Circuit, 218 F. R., 364.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Roads to be Improved, Selecting. By Fairfax Harrison, President of the Southern Railway, 1,500 words. Southern Good Roads, January. 10 cts.

Two Million Dollars for Roads. Scheme of expenditures planned for Cook County, Ill. By Stanley E. Bates, 2,500 words. Better Roads and Streets, January. 15 cts.

Engineering and Supervision of Roads. By W. S. Keller, State Highway Engineer of Alabama, 2,500 words. Southern Good Roads, January. 10 cts.

Conditions Determining Maximum Grades and Methods and Cost of Road Grading in West Virginia. Economic conditions affecting the maximum grade; hauling with regards to motor truck and horses, and costs of grading on various roads in West Virginia, 2,500 words. Engineering and Contracting, January 6. 10 cts.

Columbia Highway in Oregon. A remarkable scenic highway built in many places on concrete viaduct or in tunnel, and in some places protected by retaining walls. By Henry L. Bowlby, 5 1/2 ills., 1,200 words. Engineering News, January 14. 15 cts.

Progress on Central Highway in Western North Carolina. Description of the work on the new trunk highway through the Blue Ridge Mountains from Old Fort to Ridge Crest. By N. Buckner, 5 1/2 ills., 1,200 words. Southern Good Roads, January. 10 cts.

Building California's Highways. Characteristics and types of roads in systems being constructed under \$18,000,000 bond issue. Extracts from an article by A. B. Fletcher, State Highway Engineer of California, 1 1/2 ills., 5,000 words. California Highway Bulletin, January 1. 10 cts.

Road Foundations. Discusses the advantages of the use of gravel, stone, concrete and other materials. From a paper before the American Road Builders' Association by J. A. Johnson of the Massachusetts Highway Department, 3,500 words. Better Roads and Streets, January. 15 cts.

Road Location and the Economics of Road Improvements. The requirements of an ideal road from the standpoint of service and economy are discussed. By D. Tucker Brown, 4,000 words. Engineering and Contracting, January 6. 10 cts.

Rights of Way. Describes the difficulties of securing rights of way especially in the country where the land is divided into rectangular sections, and planted with orange groves. From a paper by Austin B. Fletcher, State Highway Engineer of California, 1 1/2 ills., 5,000 words. California Highway Bulletin, January 1. 10 cts.

Selection of Machinery for Highway Construction. From a paper before the American Road Congress by T. R. Agg, Professor of Highway Engineering, Iowa State College, 3,000 words. Canadian Engineer, January 14. 15 cts.

Building Roads with a 5-Ton Motor Truck. Description of the work in Georgia with 5-ton road trucks, each pulling five trailers; gives detailed cost of operation and of building, 3 1/2 ills., 2,500 words. Better Roads and Streets, January. 15 cts.

Power Road Machinery with Special Reference to Hauling and Earth Road Grading. Discusses hauling with special reference to motor trucks; grading earth roads with motor trucks and specially devised machinery; describes power appliances of use in road construction, 3,300 words. Engineering and Contracting, January 27. 10 cts.

Brick Pavement Experience in Toronto, Ont. Use of a new type of wire-cut-lug hillside brick laid in longitudinal courses, 2 1/2 ills., 900 words. Engineering News, January 28. 15 cts.

Brick Roads and Streets. Gives speci-

fications for the construction of sub-grade, base and wearing surface. By John Laylin, Ohio State Highway Department, 3,800 words. Better Roads and Streets, February. 15 cts.

Concrete Roads. Describes roadbed and gives specifications covering width and thickness, cement, coarse and fine aggregate, mixing, placing and finishing and curing. By H. J. Kuelling, Milwaukee County Highway Commissioner, 1,500 words. Better Roads and Streets, February. 15 cts.

Modern Methods and New Devices Used on Two Concrete Roads. 6 1/2 ills., 1,500 words. The Contractor, February 1. 20 cts.

Pavement, Curb and Gutter Made in One Piece Reduce Construction Cost. Economies effected in middle west by integral curb construction which adds only a few cents a yard to pavement cost, 9 1/2 ills., 300 words. Engineering Record, January 23. 10 cts.

Concrete Roads vs. Concrete Foundations. Covers factors, cost, durability, ease of maintenance, cleanliness, resistance to traction, sanitation and general acceptability. By W. W. Crosby, 5,000 words. The Surveyor, January 22. 40 cts.

Concrete Paving in Columbia, S. C. From a report by John McNeal, city engineer, 600 words. Municipal Journal, February 4. 25 cts.

California Concrete Road. Description of the process of construction of an asphaltic concrete road on a 4-inch concrete base. By James E. Woodson, division engineer, 2,000 words. California Highway Bulletin, January 1. 10 cts.

Detailed Construction Methods and Costs of a Long Section of Concrete Highway in California. Continued from the December issue, 8,000 words. Better Roads and Streets, January. 15 cts.

Combination Concrete Road and Flood Channel. Shallow channel for drainage; calculations for super-elevation. By Ralph Bennett, 3 1/2 ills., 1,100 words. Engineering News, January 7. 15 cts.

Asphalt Pavements and Roads. By John M. Des Moines, 2,500 words. American Municipalities, February. 25 cts.

Purchase of Asphalt and Asphaltic Cement for a Bituminous Pavement. Discusses the advantage of using a basis of total bitumen as a measure in purchasing asphalt, and comment on the comparative costs of various brands of asphalt, 2,000 words. Engineering and Contracting, January 27. 10 cts.

Asphaltic Concrete. Defines the difference between sheet asphalt, Tonneka and asphalt concrete as used in California. Gives the grading of aggregate and amount of bitumen for each. By A. E. Loder, division engineer, 3,000 words. California Highway Bulletin, January 1. 10 cts.

Camden's Municipal Asphalt Plant. Lays all sheet asphalt for the city and does street repaving; materials used and force employed; cost to department and charges made to city and street railway company, 4 1/2 ills., 2,000 words. Municipal Journal, February 4. 25 cts.

Analyses of Asphaltic Concrete and Asphalt Block laid in Washington, D. C. in 1914, 1,500 words. Engineering and Contracting, January 13. 10 cts.

Resurfacing Asphalt Paving in San Francisco. By James Owen, 2 1/2 ills., 500 words. Engineering News, January 14. 15 cts.

Heating Asphalt Pavement Aggregate. Letter to the editor, 1,000 words. Municipal Journal, February 4. 25 cts.

Wood Block Pavement, Broad Street, Newark, N. J. Special provisions taken against expansion where blocks are laid on a particularly wide street, 600 words. Engineering News, January 28. 15 cts.

European Wood Block Pavements. Describes methods of laying in all the larger cities of Europe. By George W.

Tillson, 7,000 words. Better Roads and Streets, February. 15 cts.

Wood Block Pavement without Cushion of Sand. An experimental section in the business centre of Chicago laid directly on concrete base and covered with hot pitch and sand, 2 1/2 ills., 800 words. Engineering Record, January 9. 10 cts.

Road Oil. California Highway Commission's Specifications for, 1,000 words. California Highway Bulletin, January 1. 10 cts.

The Cementing Value of Bituminous Binders and Results Obtained in some Commercial Tests. 6 1/2 ills., 7,000 words. Engineering and Contracting, January 13. 10 cts.

Pitch Filler. Pavements with. Recent development in the use of pitch filler; stone block pavement in Liverpool, New York and Cleveland; wood block in New York, 4 1/2 ills., 4,000 words. Municipal Journal, February 4. 10 cts.

Paving Work for 1915. Editorial, 1,000 words. Municipal Journal, February 4. 10 cts.

Street Paving Units. 1,000 words. Municipal Journal, February 4. 10 cts.

Selection of Paving Material. Method of determining the relative values under given conditions of stone, brick, wood, asphalt and other bituminous pavements. From paper by Geo. W. Tillson, 5,500 words. Municipal Journal, January 7. 10 cts.

Paving Statistics of American Cities. Give the pavements laid in 1914, their cost, and the material of construction; also sidewalks, curbs and gutters, 24 pages. Municipal Journal, February 4. 25 cts.

Destructor Clinker Pavements. Description of a method of paving with clinker mixed with pitch and creosote oil, 400 words. The Surveyor, January 15. 40 cts.

Suburban Development. Model Street Work in. Description of the work at Ginter Park, Richmond, Va. 3 1/2 ills., 1,000 words. Manufacturers' Record, February 4. 15 cts.

Analysis of Concrete Curb Construction for Suburban Improvements in New York City. Gives detailed time studies of performance and cost of construction in building concrete curb for suburban development work. By Allen C. Haskell, 6 1/2 ills., 4,000 words. Engineering and Contracting, January 20. 10 cts.

Street Curbs in Toledo. Sandstone curbing used almost exclusively; method of setting and cost. By Charles L. Sawyer, Superintendent of Construction, 1 1/2 ills., 800 words. Municipal Journal, January 14. 10 cts.

Construction Details and Costs of Pavements and of Sidewalks. Curbs and Gutters from many of the Cities in the Paving Tables, 3,700 words. Municipal Journal, February 4. 25 cts.

Standard Specifications for Sidewalks. As prepared by the special committee of the American Society of Municipal Improvements, 6,000 words. Better Roads and Streets, February. 15 cts.

SEWERAGE AND SANITATION.

Sewage Disposal Work at Lethbridge, Alta. Notes on the design, construction, operation and maintenance of the plant, including a description of what is known as the "Lethbridge" sedimentation tank. From a paper by A. C. D. Blanchard, 4 1/2 ills., 4,000 words. Canadian Engineer, January 28. 15 cts.

Sewage Purification at the Experimental Station of the Ontario Board of Public Health. Experimental results obtained in connection with the biologic disposal of sewage during the past three years. From report by A. D. Dellaport, 5 1/2 ills., 4,500 words. Canadian Engineer, January 14. 15 cts.

Sewage Treatment. Fundamental considerations in the design and construc-

tion of sewage treatment works which should be understood by municipal officials. 4 ills., 3,500 words. Municipal Journal, January 7. 10 cts.

Operating Sewage Disposal Plants. Suggestions of committee of Indiana Engineering Society. 1,500 words. Municipal Journal, January 21. 10 cts.

Laying Sewer Outlets in the Ocean. Description of the method employed on three different sewers as described in the paper by M. R. Pugh before the American Association for the Advancement of Science. 1,500 words. The Contractor, January 15. 20 cts.

Baltimore Sewage Pumping Plant. Sewage is pumped against a head of 72 ft. through three 42-inch discharge pipes. Drainage water is used in the condensers of the pumping engines and is handled by centrifugal pump. Sewage from the Back River disposal plant is utilized to operate 150 h.p. water wheels, the electrical output of which is used for lighting and for motor circuits at the disposal plant. By Warren O. Rogers. 7 ills., 2,000 words. Power, January 19. 5 cts.

Data and Discussion on the Handling of Sewage Sludge. Covers disposal of sludge by dumping at sea and on land, by drying and by use of fertilizers. 3,000 words. Engineering and Contracting, January 6. 10 cts.

Recommended Tests for Use in Laboratory Control of Sewage Works Operation. Outlines tests for operating control of sewage treatment works and for determining efficiency and sufficiency of treatment. 3,300 words. Engineering and Contracting, January 6. 10 cts.

Design, Construction and Cost of New Sewage Disposal Plant at Aberdeen, S. D. Describes details of design, comprising pump house, pumping equipment, gas plant, sedimentation tank, sprinkling and sludge filters and fine settling tanks. 4,000 words. Engineering and Contracting, January 13. 10 cts.

Sewage Treatment and Garbage Reduction Works for Akron, Ohio. Sewage passes through screens, adjustable grit chambers, two-story tank, sprinkling filters and secondary tanks. Sludge may be pressed or dried. 900 words. Engineering News, January 28. 15 cts.

Sewage Works Operation. Part of the report of the committee on the American Public Health Association. 1,000 words. Engineering News, January 21. 15 cts.

Sewage Disposal by Means of Electrically-Driven Pumps at Chilliwack, B. C. By D. Penzer Dunn. 2 ills., 1,500 words. Contract Record, January 20. 15 cts.

Latest Advances in Inoffensive Sewage Disposal. From a paper before the American Association for the Advancement of Science by Rudolph Hering. 5,000 words. Contract Record, January 20. 15 cts.

Sewage and Garbage Disposal Plants Now Being Built at Akron, Ohio. New features in the design of interdependent works located on adjacent sites; sludge to be pressed. 1 ills., 1,200 words. Engineering Record, January 9. 10 cts.

Multiple Flowing—Through Chambers in Imhoff Tanks. Suggestions for increasing operating efficiency; deep and shallow tanks; prevention of scum. 800 words. Engineering Record, January 16. 10 cts.

The Adoption of Fine Screens at Daytona, Fla. Gives the local conditions which lead to the adoption of this form of treatment. 1,200 words. Engineering and Contracting, January 6. 10 cts.

Waste Liquors from Tanneries. Purification of. The third of a series of articles by G. B. Kershaw. 4,500 words. The Surveyor, January 22. 40 cts.

Purification of Waste Liquors from Paper Mills. In two parts. By G. B. Kershaw. The Surveyor, January 1 and 8. 40 cts.

Disposal of Cannery Wastes. Experiments in treating corn and pea waste by screening, sedimentation, irrigation, sand filtration and contact filters. 3,000 words. Municipal Journal, January 21. 10 cts.

Sewer Construction at Ludington. Difficult construction in water-bearing sand; segment block sewer and steel sheeting; concrete sewer built under water. By George W. Clark. City Engineer. 3 ills., 1,500 words. Municipal Journal, January 21. 10 cts.

Construction Features on Passaic Valley Sewer. Contractors' methods and plant employed in tunneling for sewer 250 feet beneath Newark Bay; timbering of shafts and tunnels; equipment used. 4 ills., 3,000 words. Municipal Journal, January 21. 10 cts.

Excavating and Backfilling Sewer Trenches by Machine. Detailed costs and explanation of method used in narrow

lanes and business streets in Vancouver, B. C. 3,000 words. Contract Record, January 20. 15 cts.

Construction and Cost of a Sanitary Sewer System at Alton, Ill. From a paper before the Illinois Society of Engineers and Surveyors. By J. E. Schwaab, city engineer. 1,800 words. The Contractor, February 1. 20 cts.

A Privately Financed System of Sewers. Unusual legal and financial problems were involved in the project for the Borough of Troy, Pa. By Henry W. Taylor. 1,400 words. Engineering Record, January 16. 10 cts.

New Methods of Pneumatic Tunneling Aid Safe and Rapid Completion of the Passaic Valley Sewer Construction. Method of bracing heading excavation from needle beam used in connection with pressed steel lining plates made possible the replacement of all earth removed. 6 ills., 5,000 words. Engineering Record, January 30. 10 cts.

Stream Pollution: Its Relation to the Shell Fish Industry. By H. S. Cumming. 3,500 words. Journal of the Engineers' Club of Baltimore, January. 10 cts.

WATER SUPPLY.

Water Supplies, Iowa. Gives data on the cost of wells and on consumption of water, and discusses franchises of privately owned water works. 2,500 words. Engineering and Contracting, January 27. 10 cts.

Chicago's New Tunnel and Pumping Station Part of Comprehensive Waterworks Plant. Part I. An outline of the water works system which is being developed according to a definite plan to serve the needs of increasing population. By Horace S. Baker, Asst. City Engineer. 1 ills., 2,800 words. Engineering Record, January 16. 10 cts.

Disinfection of Public Water Supplies. Describes the various methods of treatment and the results obtained by each in different cities. By C. A. Jennings. 3 ills., 4,000 words. Fire and Water Engineering, January 13. 10 cts.

Lining the St. Louis Water Tunnel With Concrete by Means of Compressed Air. Describes pneumatic device for mixing and distributing concrete for tunnel lining. By E. C. Davis. 2 ills., 2,400 words. Engineering News, January 28. 15 cts.

Design and Construction of the New Supply Conduit of the Hartford Water Works. Describes the features of design and gives details of handling the construction work. 5,500 words. Engineering and Contracting, January 13. 10 cts.

City Tunnel of the Catskill Aqueduct. Description of the work of driving the tunnel, 11 to 15 ft. in diameter and 17.7 miles long, through solid rock. The first of a series of articles by Walter E. Spear. 3 ills., 2,600 words. Engineering News, January 14. 15 cts.

Cleveland West Side Water Supply Tunnel. A tunnel 10 ft. in diameter and 3 miles long is being driven under Lake Erie to a new crib; tunnel is being driven with a boring machine in stiff clay; lining the tunnel. 7 ills., 2,400 words. Engineering News, January 7. 15 cts.

Richmond-Twickenham Tunnel Works, London. Description of the work, including method of driving the tunnel, description of shield and method of lining behind the shield, and construction details. 6 ills., 3,000 words. Water and Water Engineering, January 15. 15 cts.

West Fork Water Works Tunnel at Fort Worth. Description of 7,000 ft. concrete spillway of the combined earth and concrete dam. Details of spillway design; description of precast concrete flow line 6 1/4 miles long. 5 ills., 1,500 words. Engineering Record, January 30. 10 cts.

Construction of Cumberland Water Works. System comprises an 80-foot dam of cyclopean masonry faced with concrete blocks, a nine-mile conduit principally of wood stave pipe, a mechanical filtration plant and a half million gallon storage reservoir. Motor trucks were used to haul material from the railroad, a distance of nine miles. 2 ills., 2,500 words. Engineering Record, January 30. 10 cts.

Madras City Water Supply. Description of new works which include an intake tower at the deepest part in the lake, an underground conduit, sand filters, pure water tank, pumps, water tower and an extension of the distribution system. 3 ills., 2,000 words. The Surveyor, January 22. 40 cts.

Municipal Pumping Stations of Detroit. Starting with one unit in 1876, new ones were installed as required. Present ca-

pacity 267,000,000 gallons per day. A new station containing two units recently completed. Operating data and cost of the past year. By Thomas Wilson. 3 ills., 3,500 words. Power, February 2. 5 cts.

Portable Water Supplies of the Hawaiian Islands. By S. W. Tay, sanitary engineer. 800 words. Municipal Journal, January 28. 10 cts.

Filtration of Water. Present practice as to the general component parts of rapid filter plants in Illinois. 1 ills., 3,000 words. Municipal Journal, January 28. 10 cts.

Relative Efficiency of Liquid Chlorine and Hypochlorite of Lime. Gives the results obtained by the use of each and the relative bacterial removal at different cities. By Frank E. Hale. 3,600 words. Fire and Water Engineering, February 3. 10 cts.

Water Waste. Experience of St. Albans, Vt., a city of 6,000 population, with water waste, fountains, meters and rates. Adoption of meterage resulted in waste curtailment. 3,500 words. Engineering and Contracting, January 20. 10 cts.

Free Water. Editorial. 600 words. Municipal Journal, January 28. 10 cts.

Leakage from Cedar Lake Reservoir, Seattle Water Supply. Serious leakage through moraine bank. Attempts to stop leaks. By Charles E. Fowler. 4 ills., 2,100 words. Engineering News, January 21. 15 cts.

Water Main Construction, Rapid, Medicine Hat, Alberta. Some notes on the performance of a gasoline driven trenching machine with dug 3,590 ft. of trench in 44 hours, the minimum depth being 8 ft. and width 40 inches. 2 ills., 1,500 words. Canadian Engineer, January 21. 15 cts.

Field and Office Methods in Connection with the Laying and Repair of Large Water Mains at San Diego. Describes procedure from the ordinance of council to the completion of the work in the field. 1,800 words. Engineering and Contracting, January 13. 10 cts.

General Principles Governing the Location and Mapping of Unchartered Portions of Water Distributing Systems. Outlines of procedure used at Philadelphia, giving both field and office methods. 2,000 words. Engineering and Contracting, January 27. 10 cts.

Hauling Heavy Water Pipes. Cross country hauling by motor truck over steep, rough and soft ground; cost much less than by horse. By Eugene C. Miles. 4 ills., 1,500 words. Municipal Journal, January 28. 10 cts.

Laying and Repairing Lines and Mains. By W. W. Albin, foreman of construction, San Diego, Cal. 1,800 words. Fire and Water Engineering, January 6. 10 cts.

Wood Stave Pipe, The Design of. Third of a series of articles on the use, design, construction, cost and durability of wood stave pipe. By Andrew Swickard. 2 ills., 7,500 words. Engineering and Contracting, January 6. 10 cts.

Decay of Wood Pipe. Staves, rather than bands, determine length of life of pipe; asphaltum or tar coating protects both bands and staves. 1,200 words. Engineering Record, January 23. 10 cts.

Hydrants in Winter. Care of. Methods in use in various cities to discover frozen or leaking hydrants, methods of thawing and of preventing freezing. 2,200 words. Municipal Journal, January 28. 10 cts.

STREET LIGHTING AND POWER

Lighting at Pueblo, Colo., White Way. Description of the installation and operation as well as costs of the original plant and the cost of operation. By E. F. Stone. 3 ills., 1,000 words. Lighting Journal, January. 10 cts.

Design and Operation of the Cleveland Municipal Electric Light Plant. From a paper by Frederick W. Ballard. 3 ills., 4,000 words. Power, January 19. 5 cts.

Fort Wayne's Street Lighting Plant. Prices charged and cost of production are given, along with itemized expenses of operation. 2,500 words. Public Service, February. 25 cts.

Opelousas' Municipal Lighting Plant. Due to the comparatively high price of coal and the local conditions an oil engine plant appears to have shown considerable saving over the former steam plant. The article also describes the difficulties of a municipal plant in a town of only 5,000 inhabitants. By A. C. Jones, superintendent. 1 ills., 1,000 words. Power, January 12. 5 cts.

Power Installation at Yorkton, Sask. Description of first municipal light and power plant in Canada to be served by

oil engine unit. Notes on engine details, compressed air equipment, water cooling apparatus, generator and switchboard. 2 ills., 2,600 words. Canadian Engineer, January 14. 15 cts.

Oil-Burning Steam Station in Seattle, Wash. Auxiliary turbine plant of the Seattle City Lighting Department on Lake Union; station wall area almost all glass. 5 ills., 3,000 words. Electrical World, January 9. 10 cts.

Hydroelectric Development at Rumford, Maine. Utilization of flowage of Androscoggin River at the Falls. Station energy is sold to paper making and chemical plants. 10 ills., 2,000 words. Electrical World, January 9. 10 cts.

Water Power at Wachusett Dam. Metropolitan Water Board utilizes head of water in reservoir to operate hydroelectric plant; commercial and mechanical details. 1 ills., 2,700 words. Municipal Journal, January 28. 10 cts.

Gas Mains, Welding High Pressure. From a paper before the American Gas Institute by J. D. Shattuck. 8 ills., 5,000 words. American Gas Light Journal, January 25. 10 cts.

Present and Future of Outdoor Lighting. Report of the committee on outdoor gas lighting presented to the National Commercial Gas Association of Detroit. 1 ills., 4,000 words. The Gas Age, February 1. 20 cts.

Sizes of Pipes for High Pressure Gas Mains. A systematic determination of necessary supply and complete analysis of layout for efficient distribution. By J. M. Spitzglass. 4 ills., 3,000 words. American Gas Light Journal, January 25. 10 cts.

Welding Gas Main Joints and Specials. Suggestions offered by makers of welding equipment from their experience with the process. 5 ills., 3,000 words. The Gas Age, February 1. 20 cts.

FIRE AND POLICE.

Fire Loss in 1914. Totals the greatest since 1908; business depression blamed; 46 fires each cause a loss of half million or over. 1,500 words. Fireman's Herald, January 9. 5 cts.

Lessons of Edison Fire. Report of the National Board of Fire Underwriters. 1,200 words. Fireman's Herald, January 9. 5 cts.

Yonker's Fire Department. Gives the history and present organization of the department and describes the fire alarm system and water service. 3,000 words. Fire and Water Engineering, January 20. 10 cts.

Dayton's Fire Protection. Department seriously undermanned; fires and losses moderate. 1,500 words. Fireman's Herald, January 23. 5 cts.

Fire Prevention, The A. B. C. of. First of a series of articles by C. A. Gasser, Chief, Bureau of Combustibles and Fire Risks, Newark, N. J. 2,500 words. Fire Engineer, January. 10 cts.

"Automatic Sprinklers" and "Fire Prevention." By Chief John Kenlon, New York Fire Department. 1,000 words. Fireman's Herald, January 9. 5 cts.

Installation and Care of Fire Protection Apparatus. How to put up and care for automatic sprinklers. By J. O. Benefield. 1 ills., 500 words. Power, January 5. 5 cts.

Motor Driven Fire Apparatus. The fourteenth of a series of articles on construction and use of motor driven fire apparatus. By Victor W. Page. 3 ills., 3,000 words. Fire and Water Engineering, February 3. 10 cts.

Pay for Fires, The Negligent Must. Ruling in Boston since the recent decision in favor of the New York Fire Department. By John A. O'Keefe, fire prevention commissioner. 700 words. Fireman's Herald, January 23. 5 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning Data. Reports from thirty-one cities giving average amount of sweepings per unit area, cost per unit area and per unit volume of sweepings. 2,200 words. Municipal Journal, January 14. 10 cts.

Street Cleaning in Chicago. 800 words. Municipal Journal, January 14. 10 cts.

Cincinnati Street Cleaning. Elaborate accounting system with monthly report, giving unit labor and overhead costs. Methods of cleaning used. 2,200 words. Municipal Journal, January 14. 10 cts.

Street Cleaning by Motor Apparatus. Cost in Springfield, Ohio, reduced one-third in 1913; motor dump truck and motor pick-up sweeper used; comparative costs of work by horse-drawn and motor apparatus. By George L. Rinkliff. 2 ills.,

1,600 words. Municipal Journal, January 14. 10 cts.

Garbage Collection in a Small City. Methods and costs of collection in Berlin, N. H. By L. J. Wertheim, City Engineer. 2 ills., 500 words. Municipal Journal, January 14. 10 cts.

Collecting Ashes and Garbage in Passaic. By Arthur Reid, superintendent of streets. 1,000 words. Municipal Journal, January 14. 10 cts.

Snow Removal in Our Leading Cities. Practices in use in some of the larger cities of the west. By George D. Steele. 7,000 words. Better Roads and Streets, February. 15 cts.

Dead Animals in Cities, Removal of. Ordinances and practices in nine large cities; provisions as to transportation and disposal. By Andrew Linn Bostwick. 2,200 words. Municipal Journal, January 21. 10 cts.

Odors at City Refuse Disposal Works. Prevention of. A study of the causes of odors in connection with the operation of municipal refuse disposal plants, with suggestions as to ways and means for preventing odors in connection with refuse disposal by dumping, burial, reduction or incineration. 2,500 words. Engineering and Contracting, January 27. 10 cts.

Wastes, Summer Municipal. Abstract of the Chicago Street Department report on the analysis of sixty loads of refuse. 1,800 words. Engineering Record, January 16. 10 cts.

TRAFFIC AND TRANSPORTATION.

Traffic Signals for Pittsburgh. 2 ills., 500 words. Municipal Journal, January 7. 10 cts.

City Street Traffic Investigation at Bridgeport. Method of conducting the traffic count. By Alfred F. Miller. 2 ills., 1,100 words. Engineering News, January 21. 15 cts.

Subways for Public Utilities, Pipes and Wires in Chicago Streets. 1,500 words. Engineering News, January 14. 15 cts.

Steamboat Landing at Peoria, Ill., Municipal. 2 ills., 400 words. Engineering News, January 7. 15 cts.

BRIDGES.

Bridge, St. Clair Avenue, Toronto. Outline of the design and construction details of a deck plate girder bridge, with a concrete stand of 100 feet, and approach spans of 40 feet. By A. M. Proctor. 14 ills., 3,500 words. Canadian Engineer, January 14. 15 cts.

A Balanced Cantilever Bridge. A description of the bridge at Chester, Pa., which spans the Chester river. Describes the peculiar features of the design and gives reason for adopting these features. By Henry H. Quimby. 2,500 words. Contract Record, January 20. 15 cts.

Instructions to Employees Governing Bridge Work by Pennsylvania State Highway Department. Gives in condensed form the instructions issued by the department. 4,000 words. Engineering and Contracting, January 13. 10 cts.

Important Questions on Highway Bridge Design. Discusses street car, motor truck and other loading; strength of railings and sidewalks and height of curb. By Willis Whited. 1,700 words. Engineering News, January 21. 15 cts.

Construction Features of the Bloomfield Bridge, Pittsburgh. Describes and illustrates the construction features of the 1,960-ft. bridge. 6 ills., 2,000 words. Engineering and Contracting, January 6. 10 cts.

Floors for Steel Highway Bridges in Illinois. From a paper by Clifford Older for the American Road Builders' Association. 6 ills., 3,000 words. Engineering and Contracting, January 6. 10 cts.

Progress of Work on the New Quebec Bridge During the First Year. By H. P. Borden. 4 ills., 1,000 words. Engineering News, January 7. 15 cts.

Standardizing Concrete Culverts. By Edward J. Whalen. 5 ills., 1,500 words. Better Roads and Streets, February. 15 cts.

Viaduct at Kansas City, Mo., Double Deck. Details of design and construction of a reinforced concrete viaduct 2,265 ft. long and with a maximum height of 110 ft. 8 ills., 2,500 words. Engineering News, January 7. 15 cts.

Reinforced Concrete Highway Trestle. Loadings, distribution for maximum stress and design of standard structure for the State of Arizona. By S. M. Cotton, chief draughtsman. 1 ills., 1,100 words. Engineering Record, January 9. 10 cts.

Causeway at New Philadelphia, Ohio. Reinforced concrete beam-and-slab structure replaces steel bridge. By Edward Stingel, county engineer. 2 ills., 1,500 words. Engineering Record, January 16. 10 cts.

MISCELLANEOUS.

Municipal Expenditures. Ed. 800 words. Municipal Journal, January 7. 10 cts.

Review of the Canadian Municipal Bond Situation for 1914. 1,200 words. Municipal World, January. 10 cts.

Markets, Chattanooga's Municipal. 2 ills., 1,500 words. Municipal Journal, January 7. 10 cts.

Garage, Municipal in Cincinnati. Used for storing and repairing most of city's motor vehicles; repair shop equipment; individual records of machines; chauffeur's daily reports. By Kenneth C. Cardwell. 6 ills., 1,850 words. Municipal Journal, January 7. 10 cts.

Volatile Liquids, Safe Storage and Handling of. By D. A. Corey. 4 ills., 2,500 words. The Fire Engineer, January. 10 cts.

Swimming Pool at Banff, Alta., Construction Features of the New Concrete. 2 ills., 2,000 words. Contract Record, January 20. 15 cts.

Underground Survey of Cincinnati. Methods and costs of securing information regarding subsurface structures prior to installation of sewerage system. By O. E. Carr. 3 ills., 3,000 words. Engineering Record, January 9. 10 cts.

Municipal Development, The Engineer's Function in. Promotion of spirit of public service; field of opportunity; necessity for engineering ability; relation between engineering and business. By Morris L. Cooke, Director Public Service, Philadelphia. 1,900 words. Canadian Engineer, January 28. 15 cts.

Testing Liquid Flow Meters. Description of the laboratory for testing and calibrating liquid flow meters by means of direct comparison of like quantities, such as volumes, inches of water head, and rates per unit time. By W. S. Giele. 5 ills., 4,000 words. Power, January 12. 5 cts.

Melting Point of Asphalt. Methods for Determining the. Describes the various tests and gives conclusions as to the utility of each. 2,500 words. Engineering Contracting, January 27. 10 cts.

Let Contracts Early. Editorial on advantages of early planning for municipal improvements. 900 words. Municipal Journal, January 14. 10 cts.

Tunnels Are Being Built Under the East River, How the New. Describes the construction work, consisting of tunneling through sand and rock by use of compressed air, lining the tunnels with cast iron and grouting the space behind the lining. 2 ills., 1,500 words. The Contractor, February 1. 20 cts.

Commission Manager Form of Government and Its Relation to the Engineering Profession. By Henry M. Walte, city manager, Dayton, O. 7,500 words. Journal of the Boston Society of Civil Engineers, January. 50 cts.

Experts, The Value of to a City Government. By Thomas H. Reed, University of California. 3,000 words. Municipal World, January. 10 cts.

Factory Construction in Large Cities. Modern Improvements in respect to fire prevention which have been adopted in factory construction. 1,500 words. Safety Engineering, January. 25 cts.

Patented Articles, Use of. Court decisions in several states as to conditions under which cities may contract for patented pavements and other articles. By John Simpson. 3,500 words. Municipal Journal, January 7. 10 cts.

Concrete to Modern Sanitation, The Application of. With discussion at the meeting of the Concrete Institute. By Henry J. Tingle. 5,000 words. The Surveyor, January 15. 40 cts.

Microscope Opens New Field in Study of Concrete. The first of a series of six articles treating of the causes of such defects as exist in concrete, and indicating remedies therefor. Microscopical photographs show clearly the voids and their detrimental influence on the strength of the mixtures. By Nathan C. Johnson. 6 ills., 6,500 words. Engineering Record, January 23. 10 cts.

Steam Discharge Data in Pennsylvania, Collection and Use of. Gauging methods employed by the state water supply commission, with particular reference to winter work when ice impedes the collection of data. Flood warnings are given to towns. By R. A. Boehringer, Asst. Engr. 1 ills., 2,200 words. Engineering Record, January 23. 10 cts.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Feb. 17-19.
IOWA ENGINEERING SOCIETY.—Annual meeting, Iowa City, Ia.

Feb. 19, 20.
MINNESOTA SURVEYORS AND ENGINEERS SOCIETY.—Annual meeting, St. Paul, Minn. Secretary, George H. Herrold, City Hall, St. Paul.

Feb. 19-20.
TECHNOLOGY CLUBS ASSOCIATED.—Third annual convention, Pittsburgh. Secretary, H. A. Rapelye.

Feb. 19-20.
LEAGUE OF WASHINGTON MUNICIPALITIES.—Fifth Annual Convention, Olympia, Wash. Secretary-Treasurer, Dr. Herman D. Brauer, Univ. of Washington, Seattle, Wash.

Feb. 23, 24.
INDIANA SANITARY AND WATER SUPPLY ASSOCIATION.—Eighth annual convention, Hotel Severin, Indianapolis, Ind. Secretary and treasurer, W. F. King, M. D., Asst. State Health Commissioner.

March 9-12.
MICHIGAN GOOD ROADS ASSOCIATION.—Seventh Annual Convention and Exposition of machinery, equipment and materials, Coliseum Annex, Grand Rapids, Mich. Secretary, Clarence K. Whiting, engineer, Kent County Road Commission.

March 11.
VERMONT SOCIETY OF ENGINEERS.—Meeting at Burlington, Vt. Secretary, George A. Reed, Barre, Vt.

March 22-26.
CANADIAN AND INTERNATIONAL GOOD ROADS ASSOCIATION.—Second annual convention, Toronto.

May 10-14, 1915.
AMERICAN WATERWORKS ASSOCIATION.—Annual Convention Cincinnati, O. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 14-18, 1915.
SOUTHWESTERN WATERWORKS ASSOCIATION.—Annual Convention, Galveston, Tex. Secretary, F. L. Fulkerson, Waco, Tex.

Sept. 20-25, 1915.
INTERNATIONAL ENGINEERING CONGRESS.—Am. Soc. C. E., Am. Inst. Min. E., Am. Soc. Mech. E., Am. Inst. E. E. and Soc. N. A. & M. E., San Francisco, Cal. Secretary, W. A. Catell, Foxcroft Building, San Francisco, Cal.

American Waterworks Association.

Features of the program planned for the entertainment of the American Waterworks Association at Cincinnati, May 10-14, were completed at a meeting of the committee on entertainment and finance at the Hotel Gibson, Cincinnati, Jan. 29. Covington and Newport, it was announced, will join with Cincinnati in entertaining the convention. Cincinnati will have as its guests over 1,000 engineers, many of whom will be accompanied by their wives and families. Director of Public Service Philip C. Fosdick, Royal Mattice and Dawson Blackmore were appointed a sub-committee on finance.

The Central States Waterworks Association will meet at the Hotel Havlin on May 9, and at that time is expected to dissolve and its members the next day to become members of the American Waterworks Association.

An automobile party for the ladies will be the feature of Thursday afternoon. In the evening the annual banquet for the men will take place at the Gibson and one for the ladies at the Sinton. On Friday afternoon the visitors will all take a six-hour boat ride.

John W. Hill, general chairman for the entertainment of the thirty-fifth annual convention of the American Waterworks Association, has completed preparation of a bill to be

handed to the Hamilton County delegation in the legislature.

This bill provides for payments of actual expenses at convention of heads or other officers of police, fire, water, sewerage, health or other departments of cities, villages and townships.

City officers making trips at the expense of their communities shall render itemized statements of their expenses, together with a report covering such matters of value to their communities as came before the convention.

Most of the other states of this country have such provision in their statutes, and ordinarily the attendance at these conventions from the smaller cities in Ohio, where salaries necessarily are modest, is negligible, and much very valuable information is lost to the heads of such departments, and consequently the public suffers. The co-operation of the Chamber of Commerce and other organizations will be asked.

Indiana Sanitary and Water Supply Association.

The eighth annual meeting of the Indiana Sanitary and Water Supply Association will be held at the Hotel Severin, Indianapolis, February 23 and 24. The meeting will open Tuesday at 10 o'clock with an address by Mayor Jos. E. Bell. This will be followed by an address by the president, Howard A. Dill, by the report of the secretary-treasurer and by the appointment of committees. Paul Lanham, pitometer operator at Washington, D. C., will read a paper on "Water Waste Elimination." Other papers will include "Vincennes' Sanitary Survey," by John A. Diggs, water chemist, Indiana State Board of Health; "Care of Private Lawns," by Col. D. N. Foster, chairman board of park commissioners, Fort Wayne, and "Lawn Sprinkling Regulations," by Jerry O'Shaughnessy, superintendent of the Columbus, O., water works. Immediately after the discussion on these papers has ended, the entire party will visit the new Fall Creek pumping station of the Indianapolis Water Co.

The following papers will be presented at the afternoon session of Tuesday: "The Standards for Water Used on Interstate Carriers," by H. E. Jordan, superintendent of filtration, Indianapolis Water Co.; "Treatment of Industrial Wastes," by Langdon Pearce, engineer sanitary district of Chicago; "Stream Sanitation," by Earle B. Phelps, professor of chemistry U. S. Public Health Service; "The Indianapolis Experimental Sewage Disposal Plant," by C. H. Underwood, city chemist, Indianapolis; "Experiences in Treating Surface Water for Algae," by W. S. Cramer, superintendent of water works, Lexington, Ky. Other business to be brought before the meeting will include the report of the committees on

Stream Pollution and Sewage Disposal, of which R. L. Sackett, professor of sanitary and hydraulic engineering, Purdue, is chairman, and on Water Purification, W. H. Durbin, manager Evansville water department, chairman.

The annual banquet will take place in the evening. Among the speakers will be Dr. D. F. Garland, Dr. J. N. Hurty, state health commissioner, Dr. P. N. Evans and Dr. Severance Burage.

At the Wednesday morning session, the following papers will be read and discussed: "The Madison, Ind., Water Supply," by J. W. Moore, consulting engineer, Indianapolis; "The Chemical Constituents of Water as Related to Specific Diseases," by Dr. H. G. Morgan, city sanitarian, Indianapolis; "Report of Committee on Legislation and Legal Decisions," by H. E. Barnard, chairman Indiana state chemist; "What Constitutes a Rate," by H. O. Garman, engineer Indiana public utility commission; "Improved Machinery," by J. N. Chester, consulting engineer; "Waterworks Economics," by R. L. Sackett. The report of the Committee on Waterworks Devices and Machinery, Quince Walling, chairman, will also be heard.

The Wednesday afternoon session will also be a busy one. The following papers will be read: "Fire Prevention vs. Fire Protection," by Richard Lieber; "Review of the Work of the Indiana Public Utility Commission," by Thos. Duncan, chairman Indiana public utility commission; "Going Value," by Leonard Metcalf, consulting engineer, Boston, Mass.; "The Great Lakes in Their Relation to Typhoid Fever," by Surgeon Taliaferro Clark, United States public health service, Washington, D. C. These will be followed by the election of officers and the reports of committees, after which the convention will visit the Indiana Child Welfare Exposition. In the evening the association will give a theatre party.

Minnesota Surveyors' and Engineers' Society.

The annual meeting of the Minnesota Surveyors' and Engineers' Society will be held at the Ryan Hotel, St. Paul, on Friday and Saturday, February 19 and 20. After the report of the secretary, the various committees will give their reports to the society. The following papers will be presented: "Indexing and Filing of Notes and Records," by F. W. McKillip, city engineer, Fairbault; "Resurveys in Cities and Villages," by B. Jas. Reynolds, city engineer, Redwood Falls; "Keeping of Costs by the Engineer," by O. H. Mann, district engineer, highway commission, Moorhead; "Roseau River Drainage Project," by E. V. Willard, state drainage engineer, St. Paul; "Drainage Problems Affecting Forestry and Agriculture," by Wm. T. Cox, state forester; "The Drainage Engineer and the Public Road," by S. L. Kennedy, deputy county surveyor,

Princeton; "Segmental Vitrified Sewer Pipe," by Wm. Danforth, municipal contracting engineer, St. Paul; discussion: "Keeping of Cost Data by the Engineer," by Geo. L. Wilson, engineer maintenance, Twin City Car Lines, St. Paul, and J. E. Carroll, superintendent construction and repair, department of public works, St. Paul; "Aims and Purposes of the League of Minnesota Municipalities," by Prof. R. R. Price, secretary; "Minnesota Roads," by J. H. Mullen, deputy engineer of roads, state highway commission; "Bridges in Minnesota," by C. E. Nagel, deputy engineer of bridges, state highway commission; "A Review of the Road Problem," by Walter F. Brooks, United States senior engineer, office of public roads, Washington, D. C.; "Materials for Concrete Roads," by Prof. C. F. Shoop, department of experimental engineering, University of Minnesota; "Some Features of Stadia Surveying and Its Broader Uses," by W. B. Saunders, consulting engineer, Minneapolis; "Explosives," by Ervin W. McCullough, department of mines, University of Minnesota; "Luminous Arc Street Lighting, Owatonna," by Harvey Dart, city engineer, Owatonna; "Practical Garbage Disposal for Small Cities," by E. W. Kibbey, civil engineer, International Falls; "Sewage Pumping Plant at Park Point, Duluth," by John Wilson, city engineer, Duluth; "Central Heating Plants for Small Towns," by J. F. Druar, consulting engineer, St. Paul; "Sewage Disposal for Small Towns," by L. A. Rowat, civil and sanitary engineer, Willmar.

Engineering Society of Johnstown.

With an initial membership of 160, including civil, mechanical, electrical and mining engineers, chemists, geologists, architects and mill men, the Engineering Society of Johnstown was organized Jan. 20 in the Chamber of Commerce rooms, with the following officers: President, John W. Gocher; vice-president, A. W. Saunders; secretary, Stewart M. Marshall; treasurer, C. P. Collins.

Michigan Good Roads Association.

The seventh annual convention of the Michigan Good Roads Association is to be held in the Coliseum Annex at Grand Rapids during March 9, 10, 11 and 12. In connection with the convention will be held a Michigan Exposition of road building machinery equipment and materials. The association has a paid membership of nearly twelve thousand, and President Philip T. Colgrove anticipates an attendance of over five thousand. Speakers of national reputation will appear on the program. The officers are: Chairman, Alvah Brown, chairman Kent Co. Road Commission; vice-chairman, J. Hackley Skinner, Kent County farm agent; secretary, Clarence K. Whiting, secretary and engineer, Kent Co. Road Commission; treasurer, Eugene D. Conger. The executive committee consists of Walter K. Plumb, secretary of the Association of Commerce; Wallace E. Crowell, of the Rapid Mixer Co., and William Cornwell, of the Austin-Western Machinery Co.

Ohio Engineering Society.

The Ohio Engineering Society held its thirty-sixth annual meeting at Ohio State University, Columbus, Ohio. These officers were elected: William F. Schepflin, president, Fremont; Prof. C. T. Moris, vice-president, Columbus; John Laylin, secretary-treasurer, Norwalk. The trustees are: Frank N. Kennedy, Washington C. H.; Prof. C. E. Sherman, Columbus; Dean F. J. Smull, Ada; W. C. Fawcett, Martins Ferry; J. R. Chamberlin, Columbus.

The society also adopted a resolution declaring that "a commissioner who is an engineer, rather than a commissioner, should be the head of the administration of the Ohio state highway department." A copy of the resolutions was ordered sent to Governor Willis.

PERSONALS

The following officers have been appointed:

Beaver, Pa.—Finance, C. M. Hughes, J. H. Cunningham, R. E. Tallon; water, G. N. Warrick, J. C. Warrick, J. F. Garvin; sewers and streets, R. E. Tallon, C. M. Hughes, J. C. Overholt; fire, J. C. Overholt, J. H. Cunningham, R. S. Hughes; police, R. S. Hughes, J. C. Overholt, G. N. Warrick; light, J. F. Garvin, G. N. Warrick, R. S. Hughes.

Oregon City, Ore.—Finance, Meyer, Hackett and Van Auken; fire and water, Long, Hackett and Albright; health and police, Albright, Long and Andrews.

Grafton, W. Va.—H. S. Wetzel, mayor; C. M. Jackson, recorder; Felix Elliot, H. J. Crogan, W. W. Haney and J. B. Bowermaster, councilmen.

Tunnelton, W. Va.—Tunnelton named the following city officials: Lowe Bramhill, mayor; I. R. Mattinglea, recorder; August Eld, Thomas Fisher, C. A. Fleegle, T. D. Hart and J. Wesley Miller, councilmen.

Taft, Fla.—Mayor, A. L. Bristol; clerk and assessor, J. F. Harrington; treasurer, O. J. Collins; councilmen, R. K. Harriman, A. J. Richardson, C. A. Tompkins; marshal and tax collector, Carl Sphaler.

Los Angeles, Cal.—Augustine W. Wright, member of board of public utilities; Henry W. Keller, member of park commission; M. P. Snyder and Byron Erkenbrecher, board of public service commissioners.

Little Falls, N. Y.—Commissioner of public works, full term, Irving E. Stacey; commissioner of fire and police, full term, William B. Shepardson; commissioner of charities, full term, George D. Ferguson; health commissioner, full term, John F. Lally and John Malone; member of municipal civil service commission, Fred W. Aashenurst; city attorney, full term, Samuel H. Newberry; city clerk, full term, Matthew A. Leahy.

Albany, Ore.—Frank Woods, street commissioner; J. R. Penland, city engineer; Dan Johnston, city attorney.

Morristown, Tenn.—Recorder, Chas. S. Stephens; city treasurer, N. D. Bushong; city attorney, W. N. Hickey; city physician, Dr. F. F. Painter; chief

of police, Joe Hall; policemen, Sherman Cary, P. L. Brock. The following standing committees: Street commissioners, R. L. Southern, chairman; C. D. Barger, J. E. Burke; finance committee, J. E. Burke, chairman; S. J. Felknor, R. L. Southern; sanitary committee, S. J. Felknor, chairman; C. D. Barger, J. E. Burke.

Kittanning, Pa.—President of council, Walter J. Sturgeon; borough solicitor, Reuben A. McCullough; chief of police, William E. Gallagher; street commissioner, David McMasters; assistant street commissioner, G. J. Wolfe; engineer, Wade Mast.

Wood Ridge, N. J.—Finance, Stoefler, Oskhagen, Klock; street, Brandenburg, Oskhagen, Fritsch; public utilities, Stoefler, Purdy, Klock; fire and police, Purdy, Brandenburg, Fritsch.

Garfield, N. J.—Finance, Walter, Guis, Haberthur; street, Hepworth, Haberthur, Walter; health and poor, Guis, Mattausch, Hepworth; lighting, Hepworth, Haberthur; police, Haberthur, Hepworth, Walter; sewer, Guis, Walter, Hepworth; water plant, Dahmert, Walter, Hepworth, Guis, Haberthur, Mattausch.

Rutherford, N. J.—Borough attorney, John M. Bell; recorder, Stanton Lawrence; engineer, Robert M. Watson; electrician, Walter M. Petty; superintendent of public works, John B. Wickware; committee on finance, Greger, Kennedy, Demarest; street, Sheaf, Kennedy, Johnston; police, Greger, Kennedy, Sheaf; fire, Kennedy, Sheaf, Johnston; light, Purdy, Johnston, Demarest; sanitary, Kennedy, Purdy, Demarest.

Carlstadt, N. J.—Borough clerk, Ernest Walmach; superintendent of streets, Gottlieb Kugler; attorney, Otto J. Strasser, engineer, Emanuel J. Zuber; recorder, Jacob Schweitzer. Committees: Finance, Starke, Fredericks, Kretz; street, Fredericks, Starke, Bade; sewer, Reif, Bade, Kretz; fire, Fredericks, Starke, Reif; police, Glock, Fredericks, Bade; light, Glock, Reif, Kretz.

East Rutherford, N. J.—Borough clerk, William W. Patrick; borough attorney, Otto J. Strasser; borough recorder, George E. Ward; borough engineers, Bowe & Wessells; members of board of health, four years, C. V. Carthy and Oscar Fortenbach. Committees were named as follows: Finance, Shaw, Oakes and Jones; police, Carstens, Westbrook and Oakes; fire, Oakes, Carstens and Jones; streets and sewers, Westbrook, Shaw and Jones; lights, Jones, Edwards and Shaw.

Lodi, N. J.—Finance, Thouret, Coenen, Galanti; streets, Coenen, Dansen, Galanti; police, Thouret, Lane, Dansen; fire and water, Lane, Brown, Galanti; lighting, Galanti, Dansen, Coenen.

North Adams, Mass.—Commissioner of public works, John Martin; city treasurer, Stephen H. Fairfield; city solicitor, William F. Barrington; board of health: Williston C. Bacon, George Chase, R. D. Canedy, M.D.; city engineer, Fred W. Proctor; city physician, John H. Riley, M.D.; all re-elected.

(Continued on page 239.)

NEW APPLIANCES

SINGLE STAGE CENTRIFUGAL PUMPS.

Single Suction, Enclosed Impeller Type.

The Goulds horizontal single stage suction enclosed impeller centrifugal pump has been developed, according to the makers, to meet a demand for high efficiency in a moderately-priced machine and is designed especially for direct connection with electric motors. A wide range of capacity and head can be obtained at motor speeds readily obtainable in direct current and alternating current of 25, 50 and 60 cycles frequency. The pump consists of but very few parts of very simple design.

In this new type of pump the casing is of volute design supported on the bed-plate so that it can be swivelled in any of eight different positions. This is convenient where space for pipe fittings is limited and it also obviates the need of a discharge elbow. The casing is made of best quality gray cast iron of uniform thickness and strength to withstand maximum working pressure. The waterway is proportioned to convert the energy of velocity of the water leaving the impeller into pressure, with the minimum of loss due to shock or eddies. The casing is flanged and bolted to the support head and located in alignment with it.

The impeller is of the enclosed type having high efficiency. It is made of close grained gray cast iron. It is hydraulically balanced against end thrust, as well as statically and dynamically. The slight amount of end thrust occurring in operation is taken up by shaft collars bearing upon babbitted surfaces which are positively lubricated. These collars also serve to space the impeller properly in the casing. The impeller is pressed upon the shaft and is held firmly in place by a carefully fitted pin. The shaft is made of high carbon, open hearth steel, accurately machined and of ample size.

The support head casting forms the stuffing box cover of the casing and contains the two bearings and carries the complete pump when assembled. The outboard end is a heavy, horizontally split, babbitted, ring oil bearing, provided with an oil stand and very

ample oil reservoir. Between the in-board end of the bearing and face of the stuffing box there is a drip pocket with tapped drain hole to catch the necessary drip. The stuffing box is of liberal dimensions and is fitted with a brass water seal ring. Its end next to the impeller is lined with a bronze bushing, forming a second bearing for the pump shaft close to the impeller, where it is most needed. This bearing is water lubricated. Both pump bearings are cast integral with the support so that they cannot be thrown out of alignment during the life of the pump—quiet running and durability being thus insured. When desired, a bronze impeller may be substituted for iron, although a steel shaft is used in all cases. The pump is not furnished in all bronze construction, owing to the type of support head.

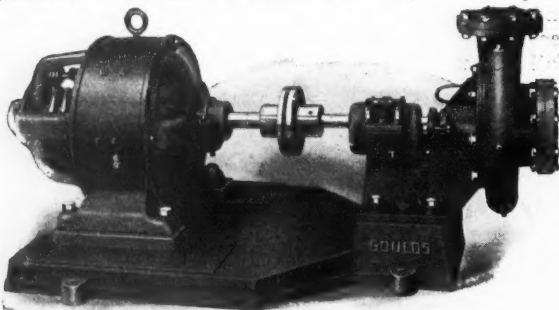
For direct connection, an extended bed-plate is provided, upon which the pump and motor are mounted. Pump and motor are connected by means of a flexible coupling. For belt drive the pump shaft is fitted with pulley and a short bedplate is provided.

Each size has four capacities—No. 2 having 80 to 140 gallons per minute; 3, 125 to 250; 4, 250 to 400; 5, 400 to 700; 6, 700 to 1,000. Pumps can be adapted for any speed within fairly wide limits corresponding to a given load and capacity. The pumps are designed to work against any head between 10 and 100 feet. The pump, which is here shown direct connected to a motor, is made by the Goulds Mfg. Co., Seneca Falls, N. Y.

A Street Lighting Bracket.

Commissioner John W. Flenniken and the city commission of Knoxville, Tenn., are considering two types of street lamp to displace the "white way" post arcs in the business section. A bracket, to be attached to every iron trolley pole, to hold either a luminous arc or a nitrogen-filled lamp, is proposed. About eighty lamps are to be used.

The brackets will be about 16 feet above the sidewalk, and the lamp will project 28 inches from the pole. In the accompanying illustration, 5 is the trolley pole; 4 shows the collars for clamping the bracket to the pole; 2 is a metal box containing the switch, and 3 the chains by which the switch is controlled. The lamps proposed are made by the General Electric Co., Schenectady, N. Y., and the bracket by the Electric Railway Equipment Co., 2900 Cormany avenue, Port Washington, Cincinnati, O.



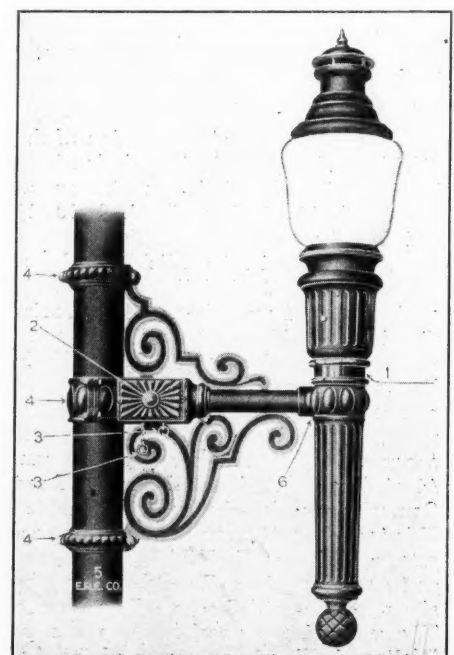
NEW GOULDS CENTRIFUGAL PUMP.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—200 tons for Appleton, Wis., let to American Cast Iron Pipe Co., and letting of 4,250 tons for Portland, Ore., postponed. 200 tons for Redford, Ind., pending. Prospective lettings in near future include 1,100 tons for Milwaukee, Wis.; 300 to 500 tons for Battle Creek, Mich.; 500 tons for Bay City, Mich., and 140 tons for Ottumwa, Ia. Quotations: 4-inch, \$25.50; 6 to 12-inch, \$23.50; 16-inch and up, \$23. Birmingham—Larger pipe works report new orders—many from the Middle West. Quotations: 4-inch, \$20; 6-inch and up, \$18. New York—Yonkers, N. Y., has opened bids on 300 tons of 8-inch, and Revere, Mass., on 375 tons of 6, 8, 10 and 12-inch. Municipal lettings now becoming rather scarce. Quotations: 6-inch, \$20 to \$20.50.

Lead.—Quotations: New York, \$3.80; St. Louis, \$3.675.

The Harrison Safety Boiler Works, Philadelphia, Pa., have just issued a 72-page booklet, describing the Cochrane Multiport Valves introduced by them for back pressure relief and vacuum service, flow service in connection with mixed flow turbines, and check valve service with bleeder or extraction turbines. The essential idea of the multiport valve is the use of a number of small disks instead of one large disk, in order to secure greater safety, quietness, lightness of moving parts, and tightness. The several disks are each fitted with an independent dash pot held to seat by independent springs, the tension of all the springs being ad-



LIGHTING BRACKET.

justed simultaneously by a pressure plate, the position of which can be changed by means of a hand wheel on the outside of the casing. In addition to descriptive and tabular matter the book contains numerous diagrams and layouts—also data on the effects of air in condensers and upon turbine performance.

The Davis Sewing Machine Co., Dayton, O., announces the delivery of one of its Dayton Tri-Car chemicals to the Dayton fire department.

The American Cast Iron Pipe Co., Birmingham, Ala., has elected Mr. J. R. McWane, formerly vice-president, to the presidency of the company. He succeeds Mr. J. J. Fagan, who becomes chairman of the board of directors, filling a new position.

PERSONALS

(Continued from page 237.)

Dover, Del.—Light and water committee: Messrs. Allee, Roe and Wright; finance: Hopkins, Burton, LeFevre; accounts: Roe, Hopkins, Wright; ordinances: LeFevre, Hayes, Burton; streets: Wright, Roe, Allee.

Waltham, Mass.—City engineer, Bertram Brewer; inspector of wires, John T. Pownall; city solicitor, Harry P. Trainor; city physician, Dr. J. C. McManama; superintendent of streets, Richard A. Jones; superintendent of sewers, Bertram Brewer; superintendent of waterworks, Daniel J. Higgins; superintendent of public buildings, Thomas Lally.

Barnwell, John, former superintendent of water and light at Rock Hill, S. C., has been elected manager of that city.

Blanchard, A. H., professor in charge of the graduate course in highway engineering at Columbia University, on February 9 delivered an address on "Economic Phases of Highway Engineering" before the Middletown Scientific Association at its meeting at Wesleyan University, and on February 11 on "The Highway Engineer in Public Life," before the Engineers' Society of Northeastern Pennsylvania.

Blodgett, Edwin A., was recently appointed water commissioner for Springfield, Mass.

Bogardus, Charles A., has been re-elected superintendent of the Chicopee, Mass., water department.

Brehm, George C., has been appointed borough engineer and street commissioner of Waynesboro, Pa.

Burnett, Henry, has been appointed manager of the Chicopee, Mass., electric light plant, succeeding Fred Unger, resigned.

Dr. W. B. Collins, state health officer of Texas, after the first meeting of the new state board of health, appointed the following standing committees: Sanitary survey, Dr. W. D. Littler, Fort Worth, chairman; Dr. Hugh L. McLauren, Dallas; Dr. W. L. Hollis, Abilene; John B. Horlie, Fort Worth; Judge John D. Robertson, Belton. Vital statistics, Dr. H. J. Childress,

Gilmer, chairman; Dr. L. M. Weinfeld, San Antonio; Dr. W. A. Davis, Austin; Dr. A. Caswell Ellis, State University, Austin; Dr. Holman Taylor, Fort Worth. Publicity, education and legislation, Dr. Hugh L. McLaurin, Dallas, chairman; Dr. L. W. Hollis, Abilene; Dr. E. M. Wood, Georgetown; Senator T. H. McGregor, Austin; Senator Clark, Shulenberg. Organization of county and city health officers, Dr. L. M. Weinfeld, San Antonio, chairman; Dr. W. D. Littler, Fort Worth; Dr. H. J. Childress, Gilmer; Dr. E. M. Thomas, Georgetown; Dr. W. A. King, San Antonio. School inspection, child hygiene and research work, Dr. L. W. Hollis, Abilene, chairman; Dr. H. J. Childress, Gilmer; Dr. Hugh L. McLaurin, Dallas; Dr. F. J. Slataper, Houston; Miss Emma Pierie, San Antonio.

Crimmons, G. S., has been elected mayor of Baker, Oregon.

Davis, Harry, has been elected chief of police of Corry, Pa.; Andrew Paulson was re-elected chief of the fire department.

Elbel, Richard, has been elected president of the South Bend, Ind., park board.

Eldredge, James R., assistant chief of the Binghamton, N. Y., fire department, has resigned to take charge of the fire prevention work for the Endicott-Johnson Co.

Goodale, Henry J., of Pittsfield, Mass., has been appointed commissioner of public works of Attleboro.

Harty, O. W., former superintendent of the Spartanburg, S. C., waterworks, has accepted a similar position at Tyrone, S. C.

Heffern, Joseph M., chief of police of Lima, O., died at that city Feb. 6. He was 43 years old and had been connected with the police department since 1899.

Henderson, J. C., has been reappointed member of the Dunkirk, N. Y., board of water commissioners.

Kichline, Albert, has been elected chief engineer of the Dover, Del., water and light plant.

Kohlhaas, Herman J., city auditor of Paterson, N. J., died Feb. 7.

Macomber, Stanley, city engineer of Centralia, Wash., has resigned.

Mahony, Eugene A., has been appointed superintendent of the Albion, N. Y., waterworks, with H. W. Fox as assistant.

McGregor, Austen H., was re-elected president of the city planning commission of Newark, N. J. Other members of the committee include F. J. Keer, vice-president; J. M. Byrne, treasurer; H. Bartholomew, secretary; E. P. Goodrich, J. C. Dana, C. W. Feigen-span, G. Staehlin, D. Grotta and A. V. Hamburg.

McLeroy, J. L., commissioner of roads and revenues of Clarke County, Ga., has resigned. His successor will be elected at a special meeting held Feb. 27.

Roulette, W. U., John Carmichael and William Wingert have been appointed sewerage commissioners of Hagerstown, Md.

Ryan, John M., has been made super-

intendent of the fire alarm division of Syracuse, N. Y.

Supple, John, has been appointed superintendent of the sewer and water department of Avon, N. J., to succeed W. H. Kittell, resigned.

Sweet, W. D., has been appointed commissioner of health, succeeding George J. Michelback, resigned, of Binghamton, N. Y.

Tarr, James H., is now chairman of the water board, Gloucester, Mass.

Thompson, Dr. William I., has been elected president of the Asbury Park, N. J., board of education.

Tustin, Ernest L., has been appointed a member of the Philadelphia recreation board.

Wilson, Robert W., has been appointed superintendent of the water income division of the Boston public works department. He succeeds J. A. McMurry, who was put in charge of meter installation.

Worrel, M. L., has been elected manager of the Meridian, Miss., water department.

Wulff, A. G., consulting engineer, has opened an office in the Provident Bank Building, Cincinnati, O.

U. S. Civil Service Examinations.

Competitive examinations under the rules of the U. S. Civil Service Commission, for the positions named, will soon be held throughout the United States.

The following-named examinations will be held on March 10, 1915: Aid, Bureau of Standards; Aid, Coast and Geodetic Survey; Assistant Inspector of Boilers; Computer, Coast and Geodetic Survey (men only); Draftsman (Copyist Topographic, Departmental Service; Junior Engineer, Engineer Department at Large; Topographic, Departmental Service); Junior Chemist, Departmental Service; Laboratory Apprentice, Bureau of Standards; Pharmacist, Public Health Service; Statistical Clerk, Departmental Service; Surveyor, Philippine Service.

The following-named examinations will be held on April 14, 1915: Civil Engineer and Draftsman; Laboratory Assistant, Bureau of Standards.

In accordance with an act of Congress, an applicant for examination for a position in the apportioned Departmental Service at Washington, D. C., will be required to be examined in the state or territory in which he resides, and to show in his application that he has been actually domiciled in such state or territory for at least one year previous to the examination. This provision does not apply to other services. Application forms and full information in regard to the above-mentioned examinations may be obtained by addressing the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of examiners at the following-named places: Post Office, Boston, Mass.; Philadelphia, Pa.; Atlanta, Ga.; Cincinnati, O.; Chicago, Ill.; St. Paul, Minn.; Seattle, Wash.; San Francisco, Cal.; Custom House, New York, N. Y.; New Orleans, La.; Old Custom House, St. Louis, Mo.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. C.	Wilmington	Feb. 20	7½ miles of clay-gravel road	L. W. Moore, Co. Comr.
Va.	Dublin	Feb. 20	\$2,000 worth street curbing	J. A. Gaines, City Clk.
Wis.	Jefferson	1 p.m., Feb. 20	Improving street	Board Public Works.
N. J.	East Orange	8 p.m., Feb. 22	255,000 gals. non-asphaltic road oil	L. E. Rowley, City Clk.
Neb.	Omaha	9 a.m., Feb. 23	Artificial stone and plank sidewalks and tiling	G. J. Flynn, City Clk.
Mich.	Flint	3 p.m., Feb. 23	Paving brick, limestone dust, asphalt, stone curb, asphaltic oils, sand, expansion joints, binder stone and asphalt paving plant	D. E. Newcomb, City Clk.
N. J.	Perth Amboy	2.30 p.m., Feb. 23	¾ and 1½-in. broken stone and screenings	Board Chosen Freeholders.
Tex.	Dallas	Noon, Feb. 23	Street paving	J. A. Harper, City Secy., Corsicana.
Mich.	Dundee	Feb. 23	6,700 yds. paving; 2,700 cu. yds. grading	Bd. Village Trustees.
Wash.	Spokane	Feb. 23	140,000 yds. asphalt macadam	County Commissioners.
Pa.	Williamsport	10 a.m., Feb. 23	Street paving	J. A. L. Milnor, Supt. Sts.
O.	Ottawa	1 p.m., Feb. 24	Macadamizing two roads	Ed. McGaharan, Aud. Putnam Co.
O.	Canton	Feb. 24	10.5 miles road work, includes 64,857 cu. yds. excavation, 58,885 yds. bit. macadam paving, 31,410 yds. brick paving and 37,692 ft. curb	County Comrs.
N. Y.	New York	Noon, Feb. 24	Repairing asphalt pavement on streets and piers along river and harbor front	R. A. C. Smith, Comr. Docks.
Ind.	Indianapolis	10 a.m., Feb. 24	Curbing and paving, two jobs	Board Public Works.
O.	Cleveland	Noon, Feb. 24	Grading and paving	A. R. Callow, Comr. P. S.
O.	Upper Sandusky	11.30 a.m., Feb. 24	Grading and paving road	Jay Marguerat, Co. Aud.
Ind.	Evansville	10 a.m., Feb. 25	Rock road construction	C. P. Beard, Co. Aud.
Ill.	Chicago	11 a.m., Feb. 25	800,000 paving brick; 3,000 yds. gravel	L. E. McGann, Com. P. S.
Ind.	Kentland	2 a.m., Mar. 1	Grading, paving and improving road	S. R. Sizelove, Aud.
Ind.	Mt. Vernon	2 p.m., Mar. 1	Grading, paving and improving road, two jobs	J. R. Haines, Aud.
Ind.	Greencastle	2 p.m., Mar. 1	Grading, paving and improving road, three jobs	C. L. Airhart, Aud.
La.	Manchester	Noon, Mar. 1	Curbing and guttering 15,200 ft.	T. Wilson, Clerk.
Ind.	Valparaiso	2 p.m., Mar. 1	Grading and paving road	C. A. Beachly, Aud.
Ind.	Richmond	10 a.m., Mar. 1	Constructing of cement sidewalk, curbs and gutters	Board of Public Works.
N. J.	Plainfield	8 a.m., Mar. 1	Crushed stone, tar and asphalt macadamizing	J. T. McMurray, City Clk.
Ind.	Portland	10 a.m., Mar. 1	Constructing road, four jobs	John Bonifas, Auditor.
Ind.	Fowler	1 p.m., Mar. 1	Paving and improving road	Warren Mankey, Aud.
Ind.	Paola	2 p.m., Mar. 1	11,403 ft. road construction	Ed. A. Palmer, Auditor.
Ind.	Greenburg	1 p.m., Mar. 1	Road construction	L. W. Sands, Co. Aud.
Ind.	Salem	1.30 p.m., Mar. 1	County road construction	I. H. Rutherford, Co. Aud.
Pa.	Sharon	Noon, Mar. 1	1,750,000 paving brick	C. E. Lartz, Sec. Borough.
O.	Upper Sandusky	Mar. 1	Fifteen miles water bound macadam	J. Marguerat, Aud., Wyandotte Co.
Pa.	Wilkes-Barre	Mar. 2	40,000 gallons road oil	City Clerk.
Ind.	Petersburg	2 p.m., Mar. 2	Stone road construction	Comrs. of Pike County.
Ind.	Kokomo	10 a.m., Mar. 2	Construction of gravel and stone road	E. B. Swift, Aud. Howard Co.
Ind.	Brownstown	2 p.m., Mar. 2	Gravel road construction	Geo. W. Stwalley, Co. Aud.
Ind.	Monticello	10 a.m., Mar. 2	Grading and paving road	A. G. Fisher, Aud.
Ind.	Corydon	2 p.m., Mar. 2	Grading and paving road	J. L. O'Bannon, Aud.
Ind.	Princeton	11 a.m., Mar. 2	Grading, paving and improving road, two jobs	W. T. Roberts, Aud.
Ind.	Crawfordsville	10 a.m., Mar. 2	Grading, draining and improving road	E. B. Engle, Co. Aud.
Ind.	Decatur	10 a.m., Mar. 2	Grading and paving road, seven jobs	T. H. Baltzell, Co. Aud.
Ind.	Washington	2 p.m., Mar. 2	Road construction	Louis S. Core, Aud.
Ind.	Bloomfield	2 p.m., Mar. 2	Paving and improving road, six jobs	Geo. E. Kidd, Co. Aud.
N. Y.	Newburgh	Mar. 2	Street paving	City Clerk.
Ind.	Shelbyville	11 a.m., Mar. 3	Paving and improving road, three jobs	Frank W. Fagel, Aud.
Miss.	Clarksdale	Mar. 3	Three miles of gravel road	W. S. Bobo, Engineer.
Miss.	Clarksdale	Mar. 3	¾ miles county road	J. R. Shidler, Engineer.
Ind.	Wabash	1.30 p.m., Mar. 3	Paving and improving road, three jobs	Dan Showalter, Co. Aud.
Ind.	Warsaw	2 p.m., Mar. 5	Road construction	Victor Mock, Aud.
O.	Mt. Gilead	Noon, Mar. 5	Macadam road construction	C. O. Higgins, Aud.
N. Y.	Watertown	Mar. 5	Wood or brick paving	City Clerk.
Ill.	Joliet	Mar. 6	Oil spreader tank truck and other machinery	A. J. Lingren, Twn. Clerk.
Fla.	Jacksonville	8 p.m., Mar. 8	About 400 yds. penetration pavement	Committee on Public Works.
Wis.	Watertown	2 p.m., Mar. 9	5,150 yds. reinforced concrete pavement and 3,735 ft. combined curb and gutter	Arnold Kraeft, City Engr.
O.	Mansfield	noon, Mar. 10	Grading and macadamizing road	Johnson Taylor, Twp. Clk.
Pa.	Wilkes-Barre	Mar. 12	Paving with asphalt, brick, etc.	City Clerk.
Pa.	Allentown	10 a.m., Mar. 15	Repairs to turnpikes	County Commissioners.
SEWERAGE.				
N. Y.	New Brighton	Noon, Feb. 23	Constructing temporary sanitary sewers	P. J. McCormack, President.
Mich.	Detroit	Noon, Feb. 23	Sewer system on Belle Isle Park	Wm. Dust, Comr. Parks.
Ind.	South Bend	Feb. 23	12 to 18-inch vitrified pipe sewer	A. P. Perley, City Clk.
Pa.	Philadelphia	Feb. 23	Sewer construction	Director, Dept. City Transit.
Pa.	Williamsport	10 a.m., Feb. 23	Sewer construction	J. A. L. Milnor, Supt. Sts. & Pub. Imp.
Va.	Richmond	Noon, Feb. 23	Brooms for hand and machine sweepers	H. J. Cohn, Supt. St. Cleaning.
Wis.	Milwaukee	Feb. 24	Constructing intercepting sewer	J. H. Fowles, Sec. Sewerage Comm.
Utah.	Payson City	2 p.m., Feb. 24	Drainage ditch construction	U. S. Reclamation Serv., Provo Sewerage Commission.
Md.	Baltimore	11 a.m., Feb. 24	About \$4,000 sewer construction	R. Daoust, Aud. Defiance Co.
O.	Defiance	Feb. 25	Open and tile ditch construction	A. R. Callow, Comr. P. S.
O.	Cleveland	Noon, Feb. 25	Sewer construction	A. M. Taylor, Dir. City Transit
Pa.	Philadelphia	Feb. 26	Sewer construction for subway	J. R. Heidelberger, Vil. Rec.
Minn.	Dumont	8 p.m., Feb. 26	1,400 ft. sewer construction	

BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
S. C.	Columbia	Feb. 23	Extension of sewer system, cost \$85,000	F. C. Wise, Engineer.
U.	Upper Sanousky	Mar.	1. Ten ditches 40,000 ft. long, 8 to 24-inch tile	J. Marguerat, Aud., Wyandotte Co.
Pa.	Philadelphia	Mar.	1. Sewer construction for subway	A. M. Taylor, Dir. City Transit
Ind.	Richmond	10 a.m., Mar.	1. Filter beds and repairs to disposal plant	Board of Public Works.
Mo.	Springfield	Mar.	2. Construction of two district sewers, to cost about \$12,000	Sam Fisher, City Engineer.
S. D.	Sisseton	2 p.m., Mar.	2. Six miles of sewers and sewage treatment plant	City Clerk.
Pa.	Philadelphia	Mar.	3. Sewer construction for subway	A. M. Taylor, Dir. City Transit
N. Y.	Lyons	noon, Mar.	3. Construction of sewer system	H. F. Zimmerlin, Clk.
Pa.	Philadelphia	Mar.	5. Sewer construction for subway	A. M. Taylor, Dir. City Transit
Ind.	Fort Wayne	Mar.	6. 2 3/4 miles ditch construction	R. W. Guenther, Co. Engr.
La.	Fort Dodge	11 a.m., Mar.	8. Tile drain construction	Co. Bd. Supervisors.
O.	East View	Noon, Mar.	8. Storm and sanitary sewers	C. E. Burger, Clk., Warrensville.
Mont.	Butte	5 p.m., March	17. Construction of 13 miles 8 to 12-in. sanitary sewers	John C. Driscoll, City Clk.

WATER SUPPLY.

N. Y.	Middletown	4 p.m., Feb.	20. Laying 6,000 ft. 20-in. water pipe	J. T. Degnan, Comr. P. Safety.
Ill.	Chicago	11 a.m., Feb.	20. 30 tons lead pipe; 100 3 to 10-in. velocity meters	L. E. McGann, Comr. P. S.
Va.	Dublin	Feb.	20. Materials for extension of water works	J. A. Gaines, City Clk.
Okla.	Yale	Feb.	20. Extensions to water works system	E. A. Pierson, City Clk.
Ga.	Augusta	Feb.	23. 2,300 ft. 6-inch main	Commanding Officer, Arsenal.
Tex.	Magnolia Park	10 a.m., Feb.	23. Water works system	W. A. Farrington, City Secy., Houston.
Ont.	Ottawa	4 p.m., Feb.	23. Brass work, c. i. pipe, pig lead and valves	Secretary, Water Works Com.
Wyo.	Laramie	Feb.	23. Cast-iron pipe; also steel, wood stave and concrete	G. E. Sevison, City Engineer.
O.	Cleveland	Noon, Feb.	24. Construction of filtration plant	A. R. Callow, Comr. P. & Sup.
N. J.	Overbrook	4 p.m., Feb.	24. Additions to water supply system at County Hospital	A. L. Lacombe, Chr. Committee on Public Bldg.
Minn.	St. Paul	2 p.m., Feb.	25. Deep well, reservoir and pump equipment	Board of Control.
Kan.	Mineral	7.20 p.m., Feb.	25. Drilling deep well	J. B. Vallembois, City Clk.
N. J.	Atlantic City	noon, Feb.	25. One 18,000,000-gallon turbo-centrifugal pump	H. Bacharach, Dir. Parks.
O.	Toledo	noon, Feb.	25. Curb boxes; 3600 water meters; 1500 tons 6 to 12-in. water pipe	A. W. Boardman, Dir. P. S.
O.	Toledo	Noon, Feb.	25. Laying 24-in. c. i. water main across Maumee River	A. W. Boardman, Dir. P. S.
Ill.	Chicago	11 a.m., Feb.	25. 5,000 3/4 to 2-inch water meters	L. E. McGann, Comr. P. S.
Wis.	Cameron	Feb.	26. Construction of an 8-inch well	W. W. Peiper, Clk.
Mass.	Boston	Noon, Feb.	26. Cast iron and semi-steel special castings	D. F. Dougherty, Supt. Supplies.
N. Y.	Hartsdale	Feb.	27. Laying 2,000 ft. 6-in. pipe; fire hydrants and valves	Water Commissioners.
Fla.	Bonifay	Mar.	1. Distribution system	A. L. Byrd, Manager.
Minn.	New Ulm	Mar.	2. Deep well pump	William Backer, City Clk.
Mass.	Fitchburg	Mar.	2. Constructing Ashby reservoir (re-advertisement)	Board Water Comrs.
N. Y.	Lyons	noon, Mar.	3. Construction of water system	H. F. Zimmerlin, Clk.
O.	East View	Mar.	8. Constructing water mains	C. E. Burger, Warrensville.
O.	Euclid	Noon, Mar.	8. Laying 10-inch water mains	H. S. Dunlop, VII. Clk.
Cal.	Los Angeles	4 p.m., Mar.	9. Water meters	Department Public Service.
O.	Toledo	noon, March	9. Construction and equipment of a high-pressure fire service pumping station	A. W. Boardman, Dir. P. S.
B. C.	Saanich	Noon, Mar.	12. Cast iron pipe, specials, valves & hydrants	H. S. Cowper, Clerk Municipal Council
Greece	Athens	Mar.	30. Water supply for Athens and additional cities, estimated cost, \$14,000,000	Bur. of Foreign & Domestic Commerce, Wash., D. C.

LIGHTING AND POWER.

Okla.	Yale	8 p.m., Feb.	20. Extension to the water and electric light system	E. A. Pierson, Clerk.
N. J.	New Brunswick	2 p.m., Feb.	23. Furnishing and installing lighting fixtures in Court House	County Building Committee.
Va.	Richmond	Noon, Feb.	23. 14 cast-iron poles for street lights	E. W. Trafford, Supt.
Okla.	Oklahoma City	10 a.m., Feb.	25. Electrical equipment for state capitol construction	State Capitol Commission.
O.	Cleveland	Noon, Feb.	26. Double braid covered wire	A. R. Callow, Comr. P. S.
S. D.	Watertown	Mar.	1. Dam across the outlet of Lake Kampeska	Codington Co. Commrs.
N. D.	Grand Forks	5 p.m., Mar.	1. Laying underground wires and installing street lighting posts	W. H. Alexander, City Aud.
Ind.	Garrett	8 p.m., Mar.	4. Generator for lighting plant	City Clerk.
N. Y.	Newark	noon, Mar.	4. Electrical work and heating for asylum	H. H. Stebbins, Pres. Bd. Trus.

FIRE EQUIPMENT.

Ill.	Aurora	2.30 p.m., Feb.	20. Combination hose and chemical	Committee on Fire.
D. C.	Washington	2 p.m., Feb.	23. 15,000 ft. 2 1/2-inch hose	District Commissioners.
N. Y.	Cortland	8 p.m., Feb.	23. Fire alarm signaling apparatus	J. R. French, City Clerk.
Minn.	Blue Earth	Feb.	23. Chemical engine	Easton Floe, City Clk.
O.	Girard	Noon, Feb.	25. One triple combination	R. L. Sanford, Clk.
O.	Toledo	noon, Feb.	25. 150 fire hydrants	A. W. Boardman, Dir. P. S.
Pa.	Wilkes-Barre	Feb.	26. Tractors, motor combinations and combination pump and hose cars	Fred H. Gates, City Clk.
Mont.	Livingston	Mar.	1. Motor combination chemical and hose	N. E. Entriken, City Clk.
Mass.	Pittsfield	Mar.	5. Air fire alarm whistle	Fire Department Committee.
O.	Toledo	Noon, Mar.	9. High pressure fire service pumping station	A. W. Boardman, Dir. P. S.

BRIDGES.

Ill.	La Harpe	3 p.m., Feb.	23. Reinforced concrete bridge	William Bergner, Supt. Hwys.
Ore.	Portland	2 p.m., Feb.	23. Columbia River bridge	Bridge Comm.
La.	Knoxville	1:15 p.m., Feb.	23. About 75 steel, I-beam & reinforced conc. bridges	J. D. Schlotterback, Co. Aud.
O.	Zanesville	11 a.m., Feb.	23. Steel bridge construction	Comrs. Muskingum County.
Neb.	Kearney	Noon, Feb.	23. Lumber for bridge construction	J. H. Dean, Co. Clk.
Kan.	Liberal	Noon, Feb.	23. Two wooden pile bridges over Cimarron River	Clerk of Seward Co.
Minn.	Chaska	1 p.m., Feb.	23. Reinforced concrete culvert	J. B. Connolly, Co. Aud.
Minn.	Watonia	2 p.m., Feb.	23. Reinforced concrete culvert	J. B. Connolly, Auditor.
Wis.	Shawano	3 p.m., Feb.	23. 60-ft. skewed plate girder bridge	O. C. Rollman, Co. Hwy. Comr.
Ala.	Mobile	Noon, Feb.	23. 1,865 ft. reinforced concrete culvert	H. Pillans, Mayor.
Ill.	Vernon	2 p.m., Feb.	24. Reinforced concrete bridge to cost \$1,325	L. S. Trainer, Co. Supt. Hwys.
Ill.	Mt. Morris	1.30 p.m., Feb.	25. Two reinforced concrete bridges	A. Anderson, Co. Supt. Hwys.
Pa.	Reading	10 a.m., Feb.	25. Reflooring bridge over Schuylkill River	D. K. Hoch, Co. Controller.
Pa.	Philadelphia	Feb.	25. Reinforced concrete boulevard bridge	M. L. Dook, Dir. P. S.
O.	Cincinnati	Noon, Feb.	26. Concrete bridge	Board County Comrs.
Ind.	Hartford City	2 p.m., Feb.	26. Constructing two culverts	John L. McGeath, Auditor
W. Va.	Elkins	Mar.	1. Seven bridges	Thaddeus Pritt, Clerk.
Ind.	Greenfield	Mar.	1. Bridge construction	Oscar Dever, City Clk.
Minn.	Winona	Mar.	1. 1,700 ft. bridge approach	H. B. Walling, City Engr.
S. D.	Oacome	1 p.m., Mar.	1. Steel and pile bridges for 1915	F. J. Leggett, Co. Aud.
Minn.	Minneapolis	11 a.m., Mar.	1. Bridge No. 15	Al. Erickson, Aud.
O.	Cleveland	Noon, Mar.	2. Steel superstructure for viaduct	A. R. Callow, Comr. P. S.
Kan.	Junction City	Mar.	2. Steel for bridge repairs	R. Moon, Clerk.
S. D.	Montrose	2 p.m., Mar.	2. Corrugated metal culverts	A. E. McKline, Co. Aud.
Ill.	Bald Bluff	10 a.m., Mar.	2. Reinforced concrete bridge	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
S. D.	Elk Point	Mar. 2	Bridge construction in 1915 (readvertisement)	Edward Holden, Co. Auditor
O.	Hamilton	10 a.m., Mar. 3	Bridge over Great Miami River	W. W. Crawford, Co. Aud.
Neb.	Superior	Mar. 3	Reinforced concrete, balanced arch bridge	County Clerk's Office.
Va.	Port Monroe	Mar. 3	Concrete foot bridge	Quartermaster.
Neb.	Nelson	10 a.m., Mar. 3	Bridge over Republican river	E. E. Hedgecock, Co. Clerk
Neb.	Nelson	Noon, Mar. 3	Bridge construction in 1915	E. E. Hedgecock, Co. Clerk
O.	Canton	10 a.m., March 3	Reinforced concrete bridge construction	Stark County Comrs.
O.	Poasttown	10 a.m., Mar. 3	Repairing abutment and constructing bridge	W. W. Crawford, Aud.
O.	Massillon	10 a.m., Mar. 5	Culvert pipe	Comrs. Stark Co.
Ill.	Biggsville	11 a.m., Mar. 9	Two reinforced concrete bridges	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.
Wis.	Racine	Mar. 15	Steel bridge construction	Jas. Mutter, Highway Comr. City Clerk.
R. I.	Cumberland	Mar. 15	Bridge	Director Public Service.
O.	Lima	Mar. 15	\$40,000 concrete bridge	Esten & Black, Pawtucket.
R. I.	Central Falls	Mar. 15	Bridge over Blackstone River	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.
Ill.	Raritan	11 a.m., Mar. 16	Three reinforced concrete bridges	L. J. Fiegel, Aud.
Minn.	Rochester	11 a.m., Mar. 18	Steel for bridges	
MISCELLANEOUS				
Ill.	Chicago	11 a.m., Feb. 20	Brick natatorium	L. E. McGann, Comr. P. S.
N. Y.	Ithaca	Noon, Feb. 23	Construction of greenhouses and installing electric work	E. L. Williams, Comptroller.
N. Y.	New York	noon, Feb. 23	Rubber hose, 12 tractors	J. T. Fetherston, Comr. St. Cl.
Tex.	Galveston	Noon, Feb. 23	Motor dredge tender	Lieut.-Col. C. S. Riche, U. S. Engr.
N. Y.	New York	Noon, Feb. 23	Dredging in Portchester Harbor	Lieut.-Col. W. M. Black, U. S. Engr.
Utah	Provo	Feb. 24	Construction work	U. S. Reclamation Service.
D. C.	Washington	11.30 a.m., Feb. 24	Valves and accessories for dry dock	Maj. F. C. Boggs, Gen. Pur. Officer.
Fla.	Bartow	Feb. 24	Construction of city hall	City Clerk.
Mass.	Boston	Feb. 25	Section H, Dorchester tunnel	B. L. Beal, Sec. Tran. Comn.
Mont.	Miles City	3 p.m., Feb. 27	U. S. post office	O. Wenderoth, Washington, D. C.
Wis.	Hudson	March 1	Automatic oil sprinkler and carload of oil	City Clerk.
Fla.	St. Augustine	10 a.m., Mar. 2	Repairs to county jail	Board of County Comrs.
Fla.	St. Augustine	10 a.m., Mar. 2	Repairs to county jail	Board of County Comrs.
O.	Canton	Mar. 3	140 yds. conc masonry for culvert construction	C. L. Stoner, Clk. Co. Comms.
Tex.	Galveston	Noon, Mar. 3	Dredging and Port Aransas culvert construction	Lieut.-Col. C. S. Riche, U. S. Engr.
Okla.	Lawton	3 p.m., Mar. 6	U. S. post office	O. Wenderoth, Washington, D. C.
Alaska	Ketchikan	2 p.m., Mar. 10	Gas engines, air compressors & hoisting engines	U. S. Lighthouse Inspector
Pa.	Allentown	11 a.m., Mar. 15	Sanitary and ventilation work in jail	County Commissioners.

STREETS AND ROADS

Troy, Ala.—Paving of city streets is being favorably considered.

Douglas, Ariz.—County Engineer J. C. Ryan will have survey made of road between Douglas & Pirtleville, to get cost of gravel surfacing.

Mesa, Ariz.—Council Maier of streets and alleys committee has recommended a street grader which could be had for \$175 and upon motion it was decided to purchase the equipment.

Hanford, Cal.—Word has been received by Merchants' Association of this city to effect that Commissioner Blaney of State Highway Association has instructed State Treasurer to allot to Kings county first \$70,000 of State highway bonds to be issued in March. This means that work on 7th St. extension of highway will commence very shortly.

Lodi, Cal.—Following bids have been received for improvement of Autumn and Victor Sts.: Autumn St.—Gerritsen & Co., curb and gutter, 60 cts.; sidewalk, 11 cts.; excavation, 30 cts. DiNapoli, 61 cts.; 10 1/4 cts.; 32 cts. Guardalibeni, 59 1/2 cts.; 10 1/2 cts.; 35 cts. Beersma, 72 cts.; 11 1/2 cts.; 30 cts. Victor St.—Gerritsen, curb and gutter, 58 cts.; sidewalk, 11 cts.; fill, 50 cts. DiNapoli, 61 cts.; 10 1/2 cts.; 40 cts. Guardalibeni, 68 cts.; 12 1/2 cts.; 38 cts. For the collection of garbage and ashes contract, S. Mangiaracini bid \$775; G. Pene, \$900. Contracts will be awarded to lowest bidders.

Pomona, Cal.—Chamber of Commerce is circulating much-signed petition which requests legislature to appropriate proposed \$200,000 for automobile highway improvement to be used in bringing ocean-to-ocean highway into Los Angeles by way of Mammoth Wash, Banning and San Bernardino, instead of letting it go by way of El Centro and San Diego.

San Diego, Cal.—For asphalt paving on concrete base, following bids have been received: California-Arizona Construction Co., San Diego, Cal., at \$0.19 per sq. ft. for paving and \$0.37 per lin. ft. for curb; Fairchild-Gilmore-Wilton Co., San Diego, at \$0.186 per sq. ft. for paving and \$0.36 per lin. ft. for curb.

San Diego, Cal.—Sum of \$200,000 may be appropriated for extension of State highway from El Centro to Yuma.

San Francisco, Cal.—Plan No. 9 has been approved for improvement of Church St.

Santa Ana, Cal.—County Highway Commission has made recommendation

to Board of Supervisors for disposal of \$240,000 surplus of good roads money, as follows: Riverside, Sec. 3, 4 and 5, 11.42 miles, cost \$66,000, Olive to Riverside County line; Placentia-Yorba, 5.40 miles, cost \$40,000, Placentia to Riverside road; Santiago Blvd., 5.85 miles, cost \$41,000, Olive to El Modena; Yorba-Linda, 2.50 miles, cost \$20,000, Yorba-Linda to Olinda road; La Habra, .75 mile, cost \$6,000, La Habra to state road; Stanton, 2.25 miles, cost \$19,000, to connect Sec. 1 and 2 of A. S. C. road; El Toro, 1.12 miles, cost \$9,500, El Toro to state road; Newport Ave., Sec. 2, 1.85 miles, cost \$14,000, state road to 17th St.; Irvine Blvd., .75 mile, cost \$6,000, Newport Ave., running southeast; First St., Tustin, .40 mile, cost \$3,000, Prospect Ave. to Newport Ave.; Main St., Tustin, .50 mile, cost \$4,000; Fairview, 1.50 miles, cost \$11,500, Greenville southerly; total, 34.29 miles, cost \$240,000.

Santa Ana, Cal.—At conference of Board of Supervisors and Highway Commission it was decided to postpone further consideration of recommendations of highway commissioners for disposal of \$240,000 surplus good roads money until Feb. 16 in order to give supervisors opportunity to determine whether or not it is advisable to call election upon \$500,000 bond issue for additional roads.

Stockton, Cal.—Board of Supervisors have adopted plans and specifications for type of dredger to be used in throwing up grade for Borden road, traversing delta section and shortening distance between Stockton and Oakland. Bids for dredger work will be received by Supervisors on March 2.

Stockton, Cal.—The San Joaquin Labor Temple Association has petitioned City Council to improve Miner Ave., between Sutter and California Sts., at the earliest possible moment.

Stockton, Cal.—Delegation of Bellota ranchers are urging improvement of main road to end of county line, a distance of about 5 miles.

Washington, D. C.—An American consular officer in Far East reports an opportunity to sell 36,000,000 pounds of cement for delivery during March and April, 1915. A detailed report covering this inquiry may be had on application to the Bureau of Foreign and Domestic Commerce or its branch offices. Negotiations should be conducted by wire. No. 15,592, Bureau of Manufactures.

West Palm Beach, Fla.—Commission-

ers are discussing the issue of from \$500,000 to \$1,000,000 of bonds for construction of roads throughout the county. If it passes board ratification of electors will be necessary and question will at once be put to a vote.

Sterling, Ill.—Cook County Board has passed resolutions authorizing a \$2,000,000 bonds issue for building good roads in Cook county. The plan is to use funds from this bond issue in completing concrete roads begun with State aid funds. The roads benefited if this plan is carried out are the extensions of Milwaukee Ave., Archer Ave., Western Ave. and South Halsted St.

Aurora, Ind.—William D. Ricketts, treasurer of Ohio county, has sold \$8,400 worth of Union township free gravel road bonds to Rising Sun First National Bank at a premium of \$21. Other bidders were the Miller Co. and the Fletcher American National Bank of Indianapolis. Road will be constructed from the boundary line of this county through Union township in Ohio county.

Brazil, Ind.—Petition is being prepared to present to county commissioners asking for new concrete or brick highway between this city and Cardonia on what is known as Morgans' Crossing, or Carbon Rd.

Greencastle, Ind.—Miller & Co., Indianapolis, have purchased \$15,640 worth of 4 1/2 per cent. Putnam County bonds for improvement of J. T. Higgins and George F. Swaim Rds. at \$16 premium.

Shelbyville, Ind.—Notice is given that sealed bids will be received at office of the treasurer of Shelby County, Shelbyville, Ind., up to 10 a. m., Feb. 18, 1915, for purchase of \$8,600 improvements bonds of said county, for purpose of providing funds for construction and improvement of certain highway, petitioned for by Frank Reed et al, in Noble township. W. A. McDonald is treasurer.

Rockville, Ind.—Parke County road bonds sold as follows: Fallen Rock Rd., Jackson Township, \$10,000, to J. F. Wild & Co., Indianapolis; W. S. Swill Rd., Liberty Township, \$3,550, to F. L. Watson and others; Whittington Corner Rd., Liberty Township, \$3,150, to Citizens' Bank, Montezuma; Eldridge McClure Rd., Howard Township, \$2,150, to W. H. Payne, Bloomington.

Valparaiso, Ind.—Improvement bonds amounting to \$53,000 will be sold Feb. 18 by Porter County for highways.

Council Bluffs, Ia.—Twenty contracting firms have submitted bids to Board of Supervisors for privilege of supplying

county with road and bridge material for coming year. Material involved includes 1,250 tons of sand, 2,500 tons of crushed stone, 7,500 ft. of culvert, either galvanized iron, tile or cement, and 200,000 ft. of Douglas fir planking and 6,000 ft. of piling. Bids were turned over to county engineer for tabulation.

Muscataine, Ia.—Applications are to be received up to March 1 for road dragging in Muscatine County according to advertisements which are now being prepared by County Engineer Ryan.

Atchison, Kan.—Resolution to grade, pave and curb the intersection of 14th and Utah Sts. has been adopted; also a resolution to pave alley in block 83, Old Atchison, known as the Pat Hayes alley. The dirt taken from this alley will be used to fill in North Third St., between Mound and Division.

Topeka, Kan.—In an effort to induce County Commissioners to gravel Seward Ave. R. from Topeka to Tecumseh, delegation of about 10 from Tecumseh township have appeared before Board of County Commissioners. Stretch of road is about 4 miles in length. Commissioners agreed to stand one-third of expense of graveling road providing township assume other two-thirds of expense.

Lexington, Ky.—Resolution has been adopted for improvement of Price Ave., from 6th St. to the line of the Belt Line Railway, by the construction of the roadway thereof with macadam, asphalt or other improved material, and by the construction of curb and gutter.

Lynn, Mass.—Street Commissioner George McPhetres has asked for \$473,500 for streets, sewers and sidewalks of city.

Peabody, Mass.—Selectmen have voted to recommend laying out of Augustus St. in King Highlands, and ask for appropriation of \$1,000 for same.

Springfield, Mass.—Department of streets and engineering will ask finance committee for appropriation of \$964,763 this year, which is an increase of about \$14,000 over expenditures of 1914.

Flint, Mich.—By unanimous vote common Council has decided to do practically all of the \$260,000 worth of paving work, on which bids had been received, by city labor under direction of city engineer. The only exception is paving of Garland St. from 7th Ave. to 9th Ave. This contract was awarded to Asphalt Block Co. Contract for this work was given on petition of residents of Garland St. The thoroughfare is now partly paved with asphalt block and it was wish of property owners that additional two blocks be built of same material. Following action by Council in rejecting paving bids, on recommendation of street committee, city engineer presented plans and specifications for construction of city asphalt plant and specifications for materials to be used in construction of pavements. City clerk was authorized to advertise for bids for construction of plant to be submitted not later than Feb. 23.

Grand Rapids, Mich.—Bids will be received by City Clerk of the City of Grand Rapids, Mich., up to 3 o'clock p. m., Feb. 23, 1915, for \$200,000 4½ per cent. street improvement bonds, dated Aug. 1, 1914. James Schriver is City Clerk.

Grand Rapids, Mich.—Upon recommendation of City Treasurer Hawkins the ways and means committee of Council will recommend that Aldermen authorize a \$240,000 bond issue for street improvements and sewers during 1915, at 4½ per cent.

Saginaw, Mich.—On Feb. 17 election will be held for voting on bond issue of \$30,000 for sidewalks.

Duluth, Minn.—At meeting of city commissioners it is expected that resolution calling for paving of Belknap St. will be adopted. Resolution provides for paving of both sides of street, leaving in middle strip 22 ft. wide. An action to compel street railway company to pay for this part of improvement is said to be contemplated.

Meridian, Miss.—Board of supervisors has sold good roads bonds for district No. 1 to C. W. McNair, of Chicago, for premium of \$1,041.

St. Joseph, Mo.—Ordinances have been read for grading and paving various streets.

Roswell, N. M.—Announcement has just been made by contractors that work on paving of south end of Main St. and 2d St. will be started March 1. Paving contracted for by city will aggregate about 14 blocks.

Bayonne, N. J.—Ordinances have been adopted for improvement of various streets.

Trenton, N. J.—Paving improvements to cost about \$60,000 have been planned.

Albany, N. Y.—The MacDonald bill, intended to make available immediately \$10,000,000 for highway improvements, has passed the Assembly without opposition.

Fredonia, N. Y.—Village Trustees on March 8 will vote on borrowing bonds in sum of \$18,000 to meet village share in improvement of Liberty and Water Sts. and Porter Ave.

Le Roy, N. Y.—Plans are being discussed for improvement of highway at Fort Hill.

Union, N. Y.—Paving of Main and Naticoke Sts. is being considered.

Asheville, N. C.—Board of county commissioners has ordered construction of road in Sandy Mush section of Buncombe County at cost of \$13,000, or which amount \$5,000 will be collected through special tax levy. People of the community have expressed a willingness to pay road taxes and work on highway will start as soon as weather permits grading. Road will be 5 miles in length.

Asheville, N. C.—Terms of contract for construction of Asheville-Weaverville road have been agreed upon between county and contractors and in event the contract is properly executed by contractor and required bond given, work will begin on road. Approximate cost of construction of this road is given at \$37,240.

Greensboro, N. C.—The \$100,000 issue of street bonds voted by citizens of Greensboro at election held last May will be placed on sale shortly. Streets that have been passed upon by City Commissioners and ordered paved are: Asheboro St., North Elm St., from Church St. to the city limits, West Market St., West Lee St. and Walker Ave.

Greensboro, N. C.—Final preparations are being made by City Commissioners to place \$100,000 issue of street bonds, voted at special election held last May, on sale. Necessary papers are being drawn up and date of sale advertised.

North Wilkesboro, N. C.—A good roads bill prepared by committee appointed last fall has been sent to Raleigh to be introduced in Legislature. Authority to call election for voting bond issue of \$500,000 for building good roads in Wilkes County is asked for.

Wilson, N. C.—See "Water Supply."

Winston-Salem, N. C.—Bonds in sum of \$50,000 have been sold for grading and curbing streets of city.

Bowling Green, O.—Resolution has been adopted declaring it necessary to improve Ada Ave., between Main and Summit Sts., in city of Bowling Green, O., by macadam, asphalt or concrete; also resolution declaring it necessary to improve Evers Ave., between Grove and Prospect Sts., by macadam, asphalt or concrete.

Cincinnati, O.—Resolution has been passed, declaring it necessary to improve Maplewood Ave., from Helen St. to McCormick Pl., by paving with bituminous macadam.

Cincinnati, O.—Resolution has been passed declaring it necessary to improve Wilkinson St., from Symmes St. to Walton alley, by paving with brick. Also Starry alley, from 9th St. to Richmond St., by paving with brick, and Schenck alley, from Pendleton St. to Pendleton alley, by paving with brick.

Cincinnati, O.—Resolution has been adopted declaring it necessary to improve Montgomery Rd., from Gilbert Ave. to Norfolk & Western Railway, by paving with wood block and granite; also resolution declaring it necessary to improve Slack St., from Highland Ave. to Young St., by repaving bowlder pavement.

Columbus, O.—Repaving of High St., from Town St. to Union Station viaduct, will be undertaken in two sections. First work will start soon after March 1, it is expected.

Navarre, O.—Paving of Canal and Main Sts. is being planned.

Painesville, O.—Bids will be received by Director of Public Service of the city of Painesville, O., at the council chamber, city hall, until 12 o'clock, noon, Feb. 24, 1915, for furnishing necessary labor and materials for improving Liberty St., from Park to south corporation line of said city, by grading, draining, curbing and paving with brick on concrete foundation, with asphalt or other material. Work will include, besides minor items incident to such work, approximately 10,823 cu. yds. of excavation, 17,428 sq. yds. of pavement, 10,822 lin. ft. of stone curb and headers. M. A. Tuttle is director of public service.

Salem, O.—Paving of McKinley Ave.

has been planned for summer. It will be paved with vitrified block.

Toledo, O.—Bids will be received at office of the City Auditor, Toledo, O., until 12 M., Monday, March 8, 1915, for purchase of \$100,000 city of Toledo 4½ per cent. general street improvement bonds. Amos McDonnell is City Aud.

Toledo, O.—County Commissioners have decided to repair between 40 and 50 miles of Lucas County highways this year, and are eager to get the work under way. The work will be done by county itself, with its own building equipment, except here and there a small stretch that will be done by contractors. Work will cost over \$150,000.

Youngstown, O.—Widening of Elm St. has been petitioned for.

Youngstown, O.—Resolution has been passed to pave Hawn St. from Truesdale Ave. to Jackson St., and also resolution to repave Madison Ave. from Bryson St. to west line of outlet No. 52.

Youngstown, O.—Widening of Elm St. from Wood St. to Park Ave. is urged.

Beaver, Pa.—Ordinance has been passed for widening of Allegheny St., and ordinances will be prepared for paving 4th Ave., Allegheny and 6th Sts.

Erie, Pa.—An ordinance has been introduced into Council by Director of Streets Elchhorn providing for opening of Brandes St. from 19th St. to 12th St. Extension will have uniform width of 60 ft.

Franklin, Pa.—At adjourned meeting of Council bids were received for 650,000 bricks, costing over \$12,000, to be used in paving Elk St. from 8th down to 4th and in repaving Howard St. over top of present paving and in repaving Atlantic Ave. with concrete base. Bids were as follows: Mack Manufacturing Co., Cumberland, W. Va., \$14.50 per thousand for bricks running 59 to the sq. yd.; \$19.95 for pressed bricks 42 to the yd.; \$19.95 for wire cut bricks 40 to the yd. Standard Firebrick Co., Bradford, No. 1 paving block, delivered between April 1 and June 15, \$21.75 per thousand, or 87 cts. per sq. yd. of pavement. Face and Fire Brick Co., Pittsburgh, \$19.50 per thousand for bricks running 40 to the yd. Pennsylvania Clay Brick Co., Crows Run, Pa., No. 1 fire clay brick, 42 to the yd., \$18.90 per thousand. Total bid, \$12,515.10. Bessemer Limestone Co., Youngstown, O., No. 1 Bessemer paving block, 40 to the yd., \$19.50 per thousand or 78 cts. per yd. of pavement. If bought before April 1, \$19 per thousand and 76 cts. per yd. This is the same brick that was used in repaving 13th St. Globe Brick Co., Pittsburgh, Porter National repressed paving block, \$19 per thousand, 42 to the yd.

Haverford, Pa.—See "Miscellaneous."

Hazleton, Pa.—Ordinance has been introduced providing for issuing of bonds in amount of \$30,000 for paving of Alter St. and arching channel of Locust St. sewer.

New Castle, Pa.—Paving improvements are being planned.

Pottsville, Pa.—The main street of St. Clair will be paved during coming summer.

Williamsport, Pa.—Purchase of street sweeper is being discussed.

Williamsport, Pa.—Ordinance has been passed providing for grading and paving from curb to curb, with asphalt, block, brick or other approved paving material, on a concrete foundation, and curbing of all that portion of West 4th St. from the Pennsylvania Railroad to Cemetery St., on Cemetery St. to Northern Central Railroad, and on Erie Ave. to Lycoming Creek Bridge.

Union, S. C.—County may vote on \$200,000 bond issue for permanent road building.

Knoxville, Tenn.—To issue \$500,000 in pike bonds, place all of roads in first-class condition and take pike fund that taxpayers are now paying to pay interest and keep new roads in repair, are purposes of bill which Squire S. L. Baker will present to Knox county court for ratification.

Ballinger, Tex.—For purpose of discussing advisability of asking Commissioners' Court of Runnels county to call election at which bond issues to amount of \$60,000 will be asked for in road precinct No. 1, a mass meeting of citizens of concerned precinct has been called to meet with the Commissioners.

Cleburne, Tex.—If City Council includes street paving proposition in municipal bond issue, to be voted on March 6, 1915, by people of this city it will make total of \$410,000, divided as follows: For sewer system \$180,000, for ward school buildings \$130,000 and

\$100,000 for paved streets. It is believed after street paving is once started it will be continued until entire city is paved.

Corpus Christi, Tex.—Council will purchase steam road roller.

Corpus Christi, Tex.—Four hundred and forty-four property owners of Corpus Christi have voted on proposals to issue bonds in amount of \$100,000 for permanent street paving, and of the number 114 favored the issue.

Corpus Christi, Tex.—The City Council has voted to have 4th Ave. paved from North 11th St. north to 29th St. with gravel concrete macadam.

El Paso, Tex.—Myrtle Ave. will be paved from Ange St. to Eucalyptus St. and Texas St. from Cotton Ave. to Alameda Ave.

Galveston, Tex.—Commissioner of Streets and Public Property has been given authority to advertise for bids on some \$1,200 worth of mudshell for street work.

Galveston, Tex.—Petitions are in course of preparation and shortly will be presented to board of city commissioners requesting paving of Ave. O, from 23d St. to 27th St., with concrete, same as now used on Broadway. These petitions are based on understanding and belief that it already is generally intended to pave Ave. O, from Tremont to 27th St., with concrete.

Marshall, Tex.—County Commissioners have sold \$100,000 of \$300,000 issue of road bonds of road district No. 1 of Harrison County to Rollins & Sons, of Chicago. Payment is to be made within 30 days after receipt of the transcript of record.

Midlothian, Tex.—The City Council has ordered 18,335 ft. of sidewalks constructed. In addition to this, private contracts to amount of about 3,000 ft. will also be awarded. In connection with new improvement city will be forced to construct about 5,000 ft. of concrete crossings at intersections of streets.

Norfolk, Va.—Bond issue is favored for improvement of road in Kempsville, Seaboard and Pungo Magisterial districts of Princess Anne county.

Richmond, Va.—Administrative Board has directed that bids be asked for improving surface conditions of Cary St. Rd., Nine-Mile Rd., Osborne Turnpike and Williamsburg Rd. It is proposed to surface them with macadam and gravel.

Parkersburg, W. Va.—Bonds in sum of \$200,000 will be sold by City Commissioner at 3:30 p. m., March 11, 1915, for purchase of paving, laying sidewalks, curbing or sewers in various streets of city. Frank Good is City Clerk.

Everett, Wash.—An attempt is to be made by City Commissioners to carry out improvement suggested last year—the asphaltting of elevated wooden roadway extending from eastern extremity of Everett Ave. bridge eastward to point where it joins country road.

Seattle, Wash.—City Council has ordered various street improvements.

Tacoma, Wash.—City Council has ordered paving of Puyallup Ave. from A St. to Pacific Ave. with creosoted wood paving blocks. Cost will be \$2,400.50, while assessed valuation of adjoining property is \$86,675. City is to furnish creosote and St. Paul & Tacoma Lumber Co. the blocks.

Sheboygan, Wis.—Bids will be received by City Clerk John M. Steinhilber at his office in Common Council rooms until Feb. 15, at 3 o'clock p. m., for 26 pavement improvement bonds of City of Sheboygan in sum of \$25,000.

Superior, Wis.—In a resolution introduced by Commissioner F. C. Tomlinson formal provision was made for improvement and pavement of 13th St., from Hammond to Grand Ave. Resolution was unanimously adopted. In another resolution commission authorized paving of 4th St. from Tower Ave. to east line of the Omaha Railway property.

Superior, Wis.—At meeting of board of public works bids were received and opened for improvement of Tower Ave., from 1st to 3d Sts. Five bids were filed by local contractors. The following bids were filed: Brick, Russell Construction Co., \$8,919.19; John Diffor, \$9,027.45; S. A. Riches, \$9,630.25; Magnus Peterson, \$9,637.53; sandstone, John Diffor, \$10,753.96; S. A. Riches, \$11,362.45; Magnus Peterson, \$11,243.53; Russell Construction Co., \$11,127.44; reinforced concrete, Russell Construction Co., gravel, \$5,980.24, and rock, \$6,465.68; John Diffor, rock, \$6,819.20; S. A. Riches, gravel, \$6,619, and rock, \$7,502.30; Baum & Jacobs, gravel, \$6,539.40, and rock, \$7,221.95; Magnus Peterson, gravel, \$7,067.93.

Superior, Wis.—County Board of Douglas County is considering following improvements: Towns of Brule & Maple—Ashland Rd. from Maple to Brule, 9 miles, \$18,000. Town of Maple—Maple Rd., north one mile and ½ between Secs. 22 and 23, \$2,000. Town of Amnicon—Poplar Rd. from the east line of Sec. 6 to center line of Sec. 4, then north to north line of Sec. in 47-11, 2 miles, \$2,500; Spaulding Ave. from north ¼ corner Sec. 34 to west line 36-48-12, 1 ½ miles, \$2,500; Grand Ave. from Spaulding Ave. to old Bayfield Rd. and from Middle River to Young's corner, 1 ½ miles grading and macadam, \$9,000. Town of Lakeside—Lakeside Rd. from west line Secs. 12 and 13 to W. ½ line of Secs. 7 and 18-48-12, ¼ miles, including bridge at Middle River, \$6,000. Town of South Range—Black River Rd. from Lyman Lake Rd. to Bardonia Ave., 2 ½ miles, \$3,800. Town of Superior—Bardonia Ave. from north line Sec. 1 to 1,600 ft. south of center line of Sec. 12 and from 1,200 ft. north of south line of Sec. 13 to Black River Rd. in 47-14, 3 miles, \$6,000; Logan Ave., city limits to Hebrew cemetery, grade and gravel, \$1,500; Military Rd., \$6,600. Town of Summit—Black River Rd., gravel 1 mile south side Sec. 33 and grading 1 mile south side Sec. 34-47-15 including Balsam Creek bridge, \$8,000. Towns of Gordon and Wascott—Central state road, finishing from Gordon to Wascott and south to county line, \$4,000. Town of Highland—Highland Rd. from N. E. cor. S. E. S. E. Sec. 3 to old road, 1 mile, \$1,200. Village of Lake Nebagamon—Winnebougou Rd., 1 mile between Secs. 30 and 31-47-10, including bridge over Nebagamon Creek, \$4,000. Town of Bennett—Central state road, graveling swamps in Secs. 22, 26, 27, 35, \$4,000. Town of Solon Springs—Central state road in Secs. 1 and 2-44-12 to connect with Gordon, including right of way \$3,500; total, \$82,600.

CONTRACTS AWARDED.

Porterville, Cal.—For 52,500 sq. yds. of asphalt conc. wearing surface (Topeka) to Federal Construction Co., San Francisco, Cal., at \$0.1283 per sq. ft. for paving. Total bid, \$61,013.81.

Washington, D. C.—By Chairman Board Awards, Dept. of Agriculture, contracts for furnishing and delivering at Arlington Farms following: For oil asphalt, 41,500 gals., to U. S. Asphalt & Refining Co., 90 West St., New York, at \$2.619; for fluxed native asphalt, 41,500 gals., Barber Asphalt Paving Co., 1900 Land Title Bldg., Philadelphia, Pa., \$5.266, and for refined tar, 4,000 gals., Barrett Mfg. Co., 1205 Land Title Bldg., Philadelphia, Pa., at \$4.00.

Orlando, Fla.—Money for county brick roads has all arrived at Orlando banks and commissioners and contractors have signed contract and it is expected that work will begin shortly. Contracts are as follows: The Alabama Paving Co., of Birmingham, Ala., will build road from Orlando to Osceola County line. This is designated as Road No. 1, and a distance of 13 miles. The company is to begin work at Pine Castle, extending their operations each way to point of destination. The R. M. Hudson Co., of Atlanta, will build road to Plymouth, starting east of Lake Fairview and building each way. This is Road No. 5, and 16 miles in length. The Southern Paving & Construction Co., of Chattanooga, Tenn., will build other three roads from Orlando, No. 3, by way of Winter Park to the Seminole County line, and 7 miles in length; No. 2, 5 miles long, and leading to Conway, and Road No. 4, by way of Ocoee and Winter Garden, to Oakland, 16 miles distant. This company will build the road to Conway first.

Brazil, Ind.—For constructing Coop-rider and Bemis Rd., to Crouse & Schae-wecker, Clay City, at \$11,532 and \$7,641 respectively.

Franklin, Ind.—By County Commissioners of Johnson County for gravel pavement to Edward Barnett, Columbus, Ind., at \$6.274. H. L. Knox is Co. Aud.

Richmond, Ind.—F. E. Slick has received contract for paving of North 15th St. from E St. to F St. and North F St. from 15th to 16th St. His bid was 30 cts. per ft. for both straight and circular curbs and gutters, \$1.90 for pebbles or Hocking Valley brick and \$1.98 for metropolitan brick. His bid was \$77 less than the next lowest bid, that of Cronin and Meredith.

Rushville, Ind.—For construction of macadam road, 3 miles long, to Wilk & Co., Rushville, at \$14,780. Other bidders

were: Wm. Avery, Shelbyville, Ind., \$15,880; Colter & Son, Milroy, Ind., \$16,750; Wm. Emsweller, Rushville, Ind., \$18,240, and Ohio Const. Co., Rushville, at \$18,445. Allen R. Holden is Auditor.

Baton Rouge, La.—For improving roads in Road District No. 2, by Police Jury of East Baton Rouge, to N. M. George, at \$100,918.

New Orleans, La.—By Highway Dept. for 27 miles gravel roads, including bridges and culverts, to J. N. George & Sons, Shreveport, La., at \$100,918.72.

Ivanhoe, Minn.—For grading St. Rd. No. 1, Lincoln Co., Minn., to Lamoreaux Bros. Co., Omaha, Neb., at 22 cts. per cu. yd. Amount, \$9,582.65. Karl A. Hansen is County Auditor.

Great Falls, Mont.—To Fred Saner of Butte for cement sidewalks.

Roswell, N. M.—City Council has let to Kaw Paving Co. of Kansas City contract for paving of one block on North Main St. and five blocks on 4th St. Work is to be started about April 1.

New York City, N. Y.—By Board of Estimate and Apportionment for paving northern section of Riverside Drive with Bermudez asphaltic concrete to Asphalt Constr. Co., 208 Broadway, at total of \$97,044. The contract just awarded will complete the Drive to the Viaduct at 130th St., beyond Grant's tomb.

New York City, N. Y.—Contracts for improving Front St., from Adams to Bridge St., and Hudson Ave., from Nassau to De Kalb St., to W. J. Scanlan Co., 1 Union Sq., at \$12,186 and \$32,407 respectively.

New York City, N. Y.—President of Borough of the Bronx opened bids on Feb. 2, 1915, for paving with sheet asphalt on concrete foundation the roadway of Jackson Ave. from East 141st St. to East 149th St., and setting curb where necessary, together with all work incidental thereto. Five bids were received ranging from \$16,847.30 to \$18,279.40. Following are four lowest bids: Uvalde Asphalt Paving Co., \$16,847.30; Asphalt Construction Co., \$17,558.10; Barber Asphalt Paving Co., \$17,793.10; Cleveland Trinidad Paving Co., \$18,130.15. Unit prices: 8,660 sq. yds. sheet asphalt, (a) 78c., (b) 91c., (c) 91c., (d) 90c.; 1,715 cu. yds. Class "B" concrete, (a) \$4.50, (b) \$4.50, (c) \$4.50, (d) \$4.61; 1,100 lin. ft. new curb, (a) 85c., (b) 80c., (c) 85c., (d) 90c.; 3,600 lin. ft. old curb, (a) 40c., (b) 30c., (c) 35c., (d) 40c. Contract has been awarded to Uvalde Asphalt Paving Co., 1 Broadway, New York City.

Beaver, Pa.—For construction of brick pavements to R. V. Baldwin, Carapopolis, Pa., at \$6,250.

Providence, R. I.—By Common Council: With asphalt, Broad St., to Narragansett Improvement Co., at \$111,373, and with bitulithic Messer and Knight Sts., to Warren Bros., at \$19,631 and \$15,568.

Austin, Tex.—Commissioners' Court of Travis County have let contract for this county's part of government post road, and expects that active operations will start by the end of the present month. Contract was let to J. N. George & Sons, of Shreveport, La., on unit bid which government engineers figure will amount to about \$41,000. Funds allotted to this county's section of road amount to about \$46,000.

Dallas, Tex.—On recommendation of Commissioner Scott contract for paving Reiger Ave. between Henderson Ave. and Fulton St. has been awarded to Texas Bitulithic Co. on its bid of \$2,065.80.

Marshall, Tex.—The Bert Han Construction Co. of Dallas has been given contract for paving East Austin St. from Lafayette St. to Johnson St. at total cost of \$17,356.80, exclusive of 7 ft. in middle of street, which the Marshall Traction Co. will do and pay for itself. This paving is at rate of \$1.55 a sq. yd. or \$2.84 a front ft., this latter figure including cost of gutters and concrete curb. The bid accepted was for Ada, Okla., asphalt rock, 2 ins. thick, placed on a concrete base 4 ins. thick.

McKinney, Tex.—For 25,800 sq. yds. asphaltic concrete on 5-in. concrete foundation and 4,700 cu. yds. Class "A" earth excavation to Kaw Paving Co., Topeka, Kan., at \$1.56 per sq. yd. for paving and 35 cts. per cu. yd. for excavation. Total bid, \$55,919.79. "Texaco" asphalt is to be used.

Chehalis, Wash.—Board has awarded contract for completion of hard surface pavement connection between city limits of Chehalis and Centralia to Two Miracle Concrete corporation for \$13,000. Distance is a fraction more than one

mile. Contract for upwards of one mile of Pacific highway, south and east of Chehalis, ending at Phillips bridge will go to either Jacobsen-Bede Co., whose bid was \$15,458.61; or to M. D. Hogan, whose bid was \$15,572.54. These were lowest offers. Also, on mile from Toledo northward to Chehalis on Pacific highway across Cowlitz prairie the bids of the Two Miracle Concrete Corp., and Jarvis & Garvey were lowest, the former being \$14,000, and latter being \$14,737.

SEWERAGE

Bay Minette, Ala.—Mayor W. D. Stapleton of this place has announced that all of the paper connected with bond issue for public improvements at this place have been approved by purchasers of bonds and that he expects to have money on hand shortly to begin the work. Bond issue was made by town in amount of \$35,000 for purpose of putting in sewerage, an electric lighting plant and system and a complete water works system.

Marysville, Cal.—City Council has received report of City Engineer W. M. Meek on probable cost of proposed improvements on border of Ellis Lake, furthered by Ellis Lake improvement Co. Meek's figures show total of \$28,599.27 as cost of proposed work. Expense is divided as follows: Construction of 48-in. reinforced concrete sewer, \$14,400; construction of four manholes, \$120; one 36-in. culvert under 14th St., \$250; filling present culvert across 14th St., \$140; filling D St. from Ninth St. north, \$5,863.50; filling lake west of D St., \$7,575.77.

Alton, Ill.—City Comptroller has turned over to First Trust and Savings Bank bonds to total of \$84,600 being bonds issued against Upper Alton sewer improvement.

Springfield, Ill.—Resolutions directing engineer to complete plans and estimates for sewer in Pleasant St. and one in York and connecting sewers have been given second readings and passed.

Richmond, Ind.—City Engineer Charles has recommended that four filtering beds of southwest sewer system disposal plant be made larger and another bed be made.

Hagerstown, Md.—City Council, City Engineer Ferguson and Wm. Wingert, members of Sewerage Commission, have passed order authorizing city engineer to proceed to make thorough survey and topographical map of Hagerstown and present same to Commission.

Flint, Mich.—Bond issue for storm water and sanitary sewers will be voted on Feb. 17.

Grand Rapids, Mich.—Bids will be received by City Clerk up to 3 p. m., Feb. 23, for \$40,000 4½ per cent sewer construction bonds, dated Aug. 1. James Schriver is City Clerk.

Newark, N. J.—Bids for construction of northern portion of section No. 8 of Passaic Valley sewer, either by trench or tunnel, have been opened by Passaic Valley Sewerage Commission. This section is 3,292 ft. long and runs along Riverside Ave., this city, from Mt. Pleasant Cemetery to point 1,600 ft. south of Grafton Ave. Lowest bid on trench work was \$236,680, submitted by Mason & Hanger of New York. Low bid for tunnel work was submitted by Oscar Daniels Co. of New York. It was \$297,800. Successful bidder will probably be announced in two weeks.

Roselle, N. J.—Definite steps toward construction of joint sewer draining portions of Linden Township and the Borough of Roselle have been taken by the Borough Council. Borough Engineer Jacob L. Barier has presented a map of two municipalities outlining the prospective sewer.

Roselle, N. J.—Sewer committee has recommended that ordinance be prepared providing for construction of lateral sewer in Chandler Ave., between First and Second Sts.

Niagara Falls, N. Y.—Works commissioners and sewers committee of common council have met with City Engineer Parkhurst, and decided to lay \$200,000 worth of new sewers this summer. All but one of proposed sewers will be in East Side. The new sewers are to be laid in 24th St., from Ferry to Pine Aves.; 27th St., from Niagara St. to Pine Ave.; in 30th St., from Falls St. to Pine Ave., all to connect with Falls St. tunnel trunk sewer, and in Main St., from Pierce to Cleveland Aves. Engineer will submit estimate at works board meeting on Feb. 16.

Rochester, N. Y.—Important matter to come before Common Council at its next meeting will be final ordinance on Main St. West and East and Front St. sewer tunnel. Expense of tunnel is estimated at \$145,000, which amount will provide for tunnel and necessary shafts and connections. Tunnel will run from point near Erie Canal in Main St. West, through Main St. West and East and Front St. to sewer tunnel on property of Rochester Railway & Light Co., near Front St. and Central Ave. Ordinance also provides for reconstruction of steel pipe outlet at foot of high bank north of Commercial St., and all necessary repairs to tunnel from Commercial St. to pipe outlet. Provision is also made for construction of necessary manholes and connection of present sewers with shafts, also acquiring of necessary rights of way.

Rochester, N. Y.—Ordinance providing for construction of sewer tunnel in Main St. West and East, at cost of \$145,000, has been adopted. Tunnel will extend from canal bridge in Main St. West to Front St., and down Front St. to Central Ave.

Winston-Salem, N. C.—Bonds in sum of \$50,000 have been sold for installation of sewerage disposal plant.

Cincinnati, O.—Resolution has been adopted declaring it necessary to improve by sewerage Streng St., between Top St. and the Miami and Erie Canal.

Coshocton, O.—Modified plans are being prepared by Chester & Fleming, Pittsburg engineers, for Coshocton's proposed sewage disposal plant. Having been informed that State Board of Health will be lenient in its requirements, engineers are working on new plans whereby expense will be greatly reduced.

Salem, O.—Bonds will be sold for construction of intercepting sanitary sewers necessary to eliminate all sewerage from county ditch.

Washington, O.—Resolution has been adopted declaring it necessary to construct, maintain and operate main sanitary sewer No. 8, in subdistrict No. 2 of Lucas county, O., main sewer district No. 2, in Washington township, Lucas county, O.

Harrisburg, Pa.—About \$70,000 is on hand for sewer work this year.

Hazleton, Pa.—Ordinance has been introduced providing for borrowing sum of \$30,000 upon credit of city of Hazleton for purpose of paving Alter St., from Diamond Ave. to 9th St.; extending the stone arch sewer on 12th and Peace Sts., and providing for furnishing of said bonds and sale thereof.

Upper Darby, Pa.—Commissioners of Upper Darby Township are asking for bids for construction of sewers in Garrettford, Drexel Hill and Keystone, which will be opened at regular meeting of commissioners, in Fernwood next month. Money for these improvements will come from recent bond issue of \$150,000.

Woonsocket, R. I.—Resolution instructing City Solicitor Elphege J. Daigault to ask for legislation by General Assembly enabling city to issue sewer bonds to amount of \$50,000 has been passed.

Cleburne, Tex.—See "Streets and Roads."

Suffolk, Va.—The plans submitted to Suffolk city council on proposed sewer system for Holland-Baker and other sections of Suffolk by Dr. H. W. Campbell from information furnished by City Engineer Brinkley carries with it two propositions. First plan is to sewer all that section of West Suffolk lying between Washington St. and Seaboard Air Line and North St. and West End Brick Co.'s property, the undeveloped property known as the Lawshe Farm, Lakeside Park, Holland-Baker addition, Clause Ave., Basley Ave., Virginia St., Maryland St., Broad St., from the Norfolk & Western to Maryland St., Linden Ave. to the Norfolk & Western Railway, Gittings St. from Bosley to Lavette, and part of Philadelphia, at a cost not to exceed \$7,680. Second plan contemplates all of this and sewerage of Saratoga Pl. at an additional cost of \$3,000, should this section be annexed. All of this Saratoga, Helland-Baker and Lakeside property has a natural drainage towards Lake Kilby.

Everett, Wash.—City Engineer Hoover has received instructions to prepare plans for construction of sewer in block No. 394 of the St. Nicholas addition.

Sheboygan, Wis.—Board of Public Works has recommended that a 10-in. sewer be constructed in South 15th St.

from Virginia Ave. to a point within 150 ft. of New Jersey Ave.

Superior, Wis.—Members of City Commission has received and placed on file communication petitioning for construction of sewer in the alley between West Sixth and West Seventh Sts.

CONTRACTS AWARDED.

Huntington Beach, Cal.—Contract for second unit of sewer system has been let to Adam Delmatin, of Los Angeles, who was lowest of nine bidders on contract, his figures for job being \$7,280. There was only one local bidder, Bert Noble, the remainder, with the exception of the Holland Construction Co., of San Diego, being from Los Angeles.

Washington, D. C.—For masonry and pipe sewers contract has been awarded to Geo. Hyman, 2117 E. St. N.W., Washington D. C.; for excavation for Hillbrook sewer, 68c.; for Pinehurst sewer, 40c.; for sewer brick Hillbrook sewer, \$14 per thousand and \$12 for Pinehurst sewer; on Hillbrook sewer for laying 24-in. pipe at \$1.10 and 12-in. pipe, 60c., and 10-in. pipe, 50 cts; on Pinehurst sewer for laying 12-in. pipe, 48c. and 10-in. pipe, 44c. D. E. Garges is Chief Clerk E. D.

Hapeville, Ga.—For constructing sewers, to Case & Cothran, Chandler Building, Atlanta, Ga.

Moscow, Ida.—For constructing a 3-mile extension to present sewer system, to Witter-Fisher Co., Moscow.

Boston, Mass.—For sewerage works for Beach St. outlet between existing outlet about 165 ft. N. E. of Terminal branch of B. & M. R. R. and point 150 ft. northeasterly, Charlestown. Bids were opened Feb. 1, 1915, at 12, as follows: Marcello Construction Co., \$3,907.70; McCarthy & Walsh, \$6,361.60; Louis Balboni, \$6,549.50; John P. Cavanagh Co., \$6,905; John Landis, \$7,549.24; Anthony Baruffaldi, \$7,962.24; M. H. Kelley, \$8,000; Coleman Bros., \$8,608. Contract was awarded to Marcello Construction Co. For sewerage works for Orleans St. outlet in Private Land, between Bremen and Orleans Sts., and in Orleans St., 175 ft. northerly, E. Boston. Bids were opened Feb. 1, 1915, at 12, as follows: Marcello Construction Co., \$3,765.50; Anthony Baruffaldi, \$5,226; Louis Balboni, \$5,296; James J. Conway, \$5,432; McCarthy & Walsh, \$5,889.25; M. De Sisto, \$6,882.60; Coleman Bros., \$8,923. Contract was awarded to Marcello Construction Co.

Boston, Mass.—For pipe sewers and drains in Sheridan St., from Centre St. to point 900 ft. southeasterly, Roxbury. Bids were opened Jan. 29, 1915, at 12, as follows: Anthony Cefalo, \$2,825.40; Anthony Baruffaldi, \$3,327.98; Timothy Coughlin, \$3,530.45; M. De Sisto, \$3,632.99; Geo. J. Regan, \$3,635.55; Wm. L. Dolan, \$3,712.80; James J. Conway, \$3,874; Marcello Construction Co., \$4,229.90; Louis Balboni, \$4,415.80; Martino De Matteo, \$5,808.55; John Landis, \$6,454.03. Contract was awarded to Anthony Cefalo. Pipe sewers and drains in Marcella and Washington Sts., Roxbury. Bids were opened Jan. 29, 1915, at 12 o'clock, noon, as follows: M. De Sisto, \$3,743.10; Marcello Construction Co., \$4,136.90; A. M. Cusack, \$4,424.95; Wm. L. Dolan, \$4,495.40; James J. Conway, \$4,579; Louis Balboni, \$4,858.16; Anthony Cefalo, \$5,021.95; John F. Lynch, \$5,193.05; Martino De Matteo, \$5,384.08; John Landis, \$5,790.76; R. L. Barrett, \$6,312.50. Contract was awarded to M. De Sisto.

Saginaw, Mich.—Following are low bidders for materials: For cement sewer pipe, Consolidated Coal Co., Saginaw, 78 per cent off; for Portland cement, L. C. Smith & Co., at \$1.24 bbl.; for sewer castings, South End Foundry, at \$1.48 per 100 lbs.

Cottonwood, Minn.—For construction of clay tile sewer 6-in. to 15-in. to B. H. Bauman, Heron Lake, Minn., at \$3.390.

Fairmont, Minn.—Following contracts have been awarded: Jud. Ditch 28 to Anton Jensen, Clear Lake, Ia., at \$41,700. Jud. Ditch No. 42 to J. S. R. Hansen, Northwood, Ia., at \$21,450; Jud. Ditch No. 44 to W. C. Markland & Co., Fairmont, Minn., at \$12,500. H. C. Nolte is County Auditor.

New York, N. Y.—For changing sewers in Park Ave., to Melrose Construction Co., at \$4,830.

Richmond, N. Y.—For 220 ft. 8-in. vitrified pipe sewer, lowest bid was received from Jos. Johnson's Sons at \$322.72.

White Plains, N. Y.—Bids have been opened for the large Westchester sewer. It is said that Joseph L. Sigretto & Co., a contracting firm of Richmond

Hill, was lowest bidder. There will be a large quantity of cement used in construction of this sewer.

Piqua, O.—Contracts for sewer extension of Favorite Hill have been allowed by Service department as follows: The American Cast Iron Co., of Columbus, piping; James B. Clow, of Chicago, part of the filling; the Bourbon Copper and Brass Works, of Cincinnati, five fire hydrants.

Harrisburg, Pa.—Seven contractors have submitted bids to Commissioner W. H. Lynch, who has opened ngures for construction of four new sewers. The out-of-town firms competed and David D. Elder, of Elizabethtown, underbid local contractors for Market St. and Market Sq. job. Contractors who submitted ngures were Henry Opperman, William H. Opperman, David D. Elder, Elizabethtown; Stucker Bros. Construction Co., Reading; G. W. Ensign and William F. Martin. Council probably will be asked to let contracts to lowest bidders, who were: Sewer in Market Sq. and Market St., David D. Elder, \$7,643; Wisconsin St. from Fifth to Lexington, David D. Elder, \$4,543; Cumberland St. from Fourth to a point 110 ft. west of 15th St., Henry Opperman, \$346; Third and Geiger Sts., William H. Opperman, \$737.

Columbia, S. C.—To Hope Engineering & Supply Co., Pittsburgh, Pa., at \$28,400, for constructing sewer and water mains and to Lorick & Lowrance, Columbia, at \$5,543, for sewer pipe. F. C. Wise is engineer.

Mitchell, S. D.—For construction of vitrified pipe sewer to Aiken Const. Co., of Fargo, N. D., at \$12,611.47. Itemized bid as follows: 70½ ft. of 15-in., 4 to 14 ft. cut, \$1.75; 175½ ft. of 15-in., 14 to 16 ft. cut, \$3.50; \$62 ft. of 15-in., 16 to 18 ft. cut, \$3.70; 95½ ft. of 12-in., 14 to 16 ft. cut, \$2.10; 1,266.1 ft. of 10-in., 13 to 15 ft. cut, \$1.70; 610½ ft. of 10-in., 15 to 17 ft. cut, \$2.25; 92 6-in. Ys on 10-in. pipe, 900.; 9 6-in. Ys on 15-in. pipe, \$1.25; 2 6-in. Ys on 12-in. pipe, \$1; 9 manholes, \$72; total, branch "A," \$1,189 ft. of 12-in., 11.7 to 14 ft. cut, \$1.70; 795½ ft. of 12-in., 14 to 16 ft. cut, \$2.10; 90 6-in. Ys on 12-in. pipe, \$1; 6 manholes, \$72; total, branch "A1," \$4,213.85; total bids, \$12,611.47. Other bids were: Alamo Eng. & Supply Co., Omaha, Neb., \$15,857.68; Wm. B. Bosworth, Ada, Minn., \$12,613.15, and Pioneer Bridge Co., Mitchell, S. D., \$15,450.79. Thos. Eastcott is City Aud.

Merrill, Wis.—For 3,070 ft. of 48-in. sewer (vitrified segmental blocks) to Thornton Bros. at \$9.87 per lin. ft.

WATER SUPPLY

Bay Minette, Ala.—Members of Town Council of this place have made arrangements for putting in city waterworks, the electric lighting plant and the sewerage system. The firm of Sullivan, Long & Haggerty were bidders who received the contract and they will begin work at once.

Sacramento, Cal.—City Commission has instructed City Attorney Archibald Yell to prepare contract for employment of Charles Gilman Hyde and G. H. Wilhelm as consulting engineers to advise city in laying of new water mains for which \$2,000,000 dollars have been voted. This virtually means that Hyde and Wilhelm will be employed as consulting engineers.

Manhattan, Kan.—City commissioners have adopted plans and specifications and estimates for water softening, purification and iron removal plant, extension of distributing system, increasing supply and cleaning the mains. Estimated cost of improvements is \$72,500. Plans have been approved by state board of health and have been sent to state utilities commission and authority asked to issue the bonds.

Portland, Me.—Trustees of Portland Water District will receive bids until 12 o'clock m. on Feb. 15, 1915, for purchase of \$200,000 bonds of said district, bearing interest at rate of 4 per cent.

Georgetown, Mass.—Installation of water supply system is recommended.

Chillicothe, Mo.—Bond issue for waterworks improvements is being favorably discussed.

Phillipsburg, Mont.—On account of impossibility of maintaining adequate water supply for city during recent cold weather the city is planning reconstruction of its water line and replacement of wooden flume by wood-stave water pipe, to be buried sufficiently deep to prevent freezing.

Las Cruces, N. M.—Owing to rapid growth of Las Cruces City Council has found it necessary to make arrange-

ments for enlargement of water plant of Las Cruces. E. D. Lidstone, a consulting engineer of El Paso, has been engaged by City Council to make estimate of approximate cost of proposed enlargement of plant.

Atlantic City, N. J.—Plans and specifications for pumping engine at Absecon, capable of pumping 18,000,000 gallons of water per day, have been approved by Commissioners, and bids will be received on Feb. 25. Plans as prepared by Superintendent Van Gilder and Engineer Ferree call for a "unit" engine and pump. It will be of centrifugal type, and pump and engine will be a unit, in that a gear from engine will drive the pump.

Atlantic City, N. J.—The Sinking Fund will purchase \$75,000 worth of water bonds from the city.

Gloucester, N. J.—Ordinance for issuance of bonds to amount of \$10,000 to defray expenses of repairs to water works has been introduced.

Albion, N. Y.—Engineer Witmar, one of original firm of Witmar & Brown, of Buffalo, has visited Albion in regard to improvement of municipal water works system.

Ogdensburg, N. Y.—Announcement is made that State Conservation Commission has granted application of Madrid Water Board for approval of its maps, plans and profiles for municipal waterworks system. It is proposed to install a public water supply system for domestic use and fire protection, water to be obtained from Grasse river, filtered and pumped into system. Two and three-tenths miles of cast iron pipe, 4 ins., 6 ins. and 8 ins. in diameter are to be laid in various streets of district and to these 30 fire hydrants are to be attached. Cost is estimated at \$22,000.

Oneida, N. Y.—At regular monthly meeting of Water Commission, it is planned to bring before meeting proposition for discussion of preliminary survey of pipe line from this city to Florence Creek, in view of giving Oneida a better and larger water supply. If this is adopted work will be started with opening of spring. Following this it will be necessary to place proposition of expending about \$500,000 for work before taxpayers at special election.

Port Henry, N. Y.—The State Conservation Commission has granted application for water supply system for village of Port Henry. A new reservoir to contain 1,000,000 gallons will be erected.

Schenectady, N. Y.—Superintendent of Water C. C. MacWilliams of bureau of water, has appeared before board of contract and supply with plans for installation of new electric pumps at Rotterdam wells. Plans call for alterations to old pump house, in which new pumps are to be located. The General Electric Co. will install new pumps. Plans were approved by board.

La Grange, N. C.—Town will shortly issue \$50,000 bonds for waterworks and electric lighting plants.

Wilmington, N. C.—City Council has adopted, by unanimous vote, resolution offered by Councilman T. W. Wood, requesting Councilman Loughlin to take necessary steps to have new deep well at 10th and Fanning Sts. connected with city mains, now furnished entirely with river water, from Hilton plant, and according to present plans work of connecting the well will be begun as soon as funds can be secured. Provided Legislature authorizes proposed bond issue of \$50,000 for water and sewerage improvements, part of this will be used to make connection.

Wilson, N. C.—If proposed bills, sent to State Legislature by Board of Commissioners of Wilson, are enacted as laws considerably more than a quarter of a million dollars in bonds will be issued by Wilson for improvements. Proposed bills as drawn by City Attorney Hassell for board are four in number. One provides for issue of bonds amounting to \$95,000 for new waterworks system. Another provides for \$75,000 bond issue for municipal gas plant, and this bill is to be ratified at popular election before it becomes a law. Third bill provides for \$80,000 bond issue, proceeds of bonds to be used in paying notes given last year for funds to rebuild light and power plant. The four bills will provide \$80,000 for street improvement. Total proposed bond issue is \$330,000.

Winston-Salem, N. C.—Bonds in sum of \$50,000 have been sold for extension and improvement of water system.

East Youngstown, O.—Four propositions to supply water for village will be discussed at special meeting of Council.

Napoleon, O.—This city will get a fil-

tration plant this spring, as ordered by state board of health. It was deemed that filtration was only practicable way of purifying Maumee river, source of supply for municipal waterworks plant. By action of council board of public affairs was directed to employ engineer to draft plans and specifications of not to exceed 2,000,000 gallons a day capacity. An engineer will be chosen at board's regular meeting, February 15, and later cost of improvement will be met with bond issue.

Gallitzin, Pa.—Ordinance authorizing a special election to gain sentiment of public on proposed increase of \$60,000 in borough indebtedness to cover cost of municipal water plant has been passed finally at regular meeting of Gallitzin Council. Special election is to be held on Tuesday, April 6. Engineer Dillman, of Altoona, was present with plans and other details regarding proposed plant. Reservoir will be erected on Gum Tree Run, on other side of Bennington, about 2½ miles from Gallitzin.

Harrisburg, Pa.—Commissioner H. F. Bowman will expend more than \$15,000 in laying new water pipes and connecting old mains.

Philadelphia, Pa.—Before contract can be awarded for construction of sedimentation basin for Torresdale filtration plant, for which bids have been received, Councils will have to appropriate additional \$43,000. Low bid by the Snare & Triest Company, of New York, was for \$443,440. There is but \$400,000 of the \$1,300,000 allotted for the purpose. Original estimate was for basin of 500,000,000 gallons capacity, costing \$500,000. Limited borrowing power forced a cut in many of the \$1,300,000 loan items, and water basin estimate was cut by \$100,000. Plans were modified somewhat, but estimated cost not reduced sufficiently. Bids on the other hand, are regarded as being low, and competition was keen. There was less than \$5,000 difference between low bid of Snare & Triest Company, and that of Carl H. Camp, whose bid was \$448,364.44. The other bidders were: Keystone State Construction Company, \$481,280; T. L. Eyre, \$500,924, and the American Paving and Construction Company, \$590,500. Bids were also opened for supplying 48-inch cast iron pipe and for laying the same in connection with improvement of West Philadelphia water supply, for which \$150,000 is available. R. D. Wood & Company, at \$18.69 per ton, is low bidder for the pipe. Active competition was for laying water mains in Fifty-third and Fifty-seventh Sts., between Market St. and Girard Ave. The McNichol Paving and Construction Company was low bidder, at \$42,000, among 19 bidders.

Austin, Tex.—The attorney general's department has approved \$900,000 bond issue of city of Corpus Christi for water works improvements, enlargement and extension. Department also approved city of Magnolia water works bonds series 1, \$94,000, 40-10s, 5 per cent., and city of Magnolia park and street improvement bonds, \$40,000, 40-10s, 5 per cent.

Corpus Christi, Tex.—Attorney-general has formally offered the \$300,000 waterworks improvement bonds.

Denison, Tex.—City is planning to begin construction of about 5,000 ft. of additional water mains in short time.

Fort Worth, Tex.—A non-resident engineer will make survey of needs of water works department of city of Fort Worth as preliminary step to calling of election on bond issue, according to plans made at conference of bankers, business men and city officials.

Salt Lake City, Utah.—On recommendation of city engineer, city commission has rejected all bids opened on construction of Twin Lakes reservoir dam and has authorized city recorder to advertise for new bids. All bids received were above engineer's estimate of \$60,000. Engineer takes stand that bids are too high and he believes that better prices may be obtained by readvertising.

Salt Lake City, Utah.—Nearly 5,000 square miles of artificial lakes will be created in eastern Utah, along Green, Grand and Colorado rivers, if Colorado River control project is adopted by Congress. Plans for project, which provide for building of huge dams on Green and Grand and down on Colorado, are nearing completion. Casual estimates place cost of constructing these reservoirs or lakes at \$15,000,000. Engineers of reclamation service and of United States Geological Survey have completed preliminary surveys for building of dam to conserve 3,000,000 acre ft. of water on Green River at Bridgeport in northeast-

ern Utah, and another dam at junction of Grand and Green to conserve 5,000,000 acre ft. of water, backing it 50 miles up each river.

Sultan, Wash.—Water committee has been instructed to lay 1,700 ft. of pipe to supply residents north of High school.

CONTRACTS AWARDED.

Key West, Fla.—To A. D. Wood & Co., Philadelphia, Pa., for 1,400 ft. of 14-in., 1,200 ft. of 12-in. and 800 ft. of 10-in. bell and spigot c.-i. pipe at \$23 per ton.

Wellington, Kan.—The Commissioners awarded contracts for machinery and apparatus for water works extensions as follows: For furnishing and erecting two 400-K.D. at 80% power factor turbo alternator units, complete with jet condensers, piping, separately driven exciter sets, motor, transformers, switchboard apparatus, remote control contactor panels, etc., to the Westinghouse Electric & Mfg. Co., at \$30,700; for furnishing and erecting three 200-H.P. water tube boilers and superheaters to the Murray Iron Works at \$8,400; for furnishing and erecting two 1,000 G. P. M. duplex power pumps, one 1,500 G. P. M. turbine fire pump, feed water heater, recording Venturi meter, feed pumps, spray nozzles and piping, to Henry R. Worthington for \$8,700. The Benham Engineering Co., Oklahoma City, Okla., are consulting engineers for the city. Contracts for power house building, sub-station power house, well houses and reservoir will be let soon.

Boston, Mass.—By Supply Department for 6,500 5/8-in. meters to H. R. Worthington Co., 115 Broadway, New York, N. Y., at \$32.175 and for 350 meters to Hershey Mfg. Co., Boston, at \$6,239.

Boston, Mass.—To Gibby Foundry Co. for composition castings for water service, at total of \$12,000.

Saginaw, Mich.—For water works supplies for season to Massillon Iron & Steel Co., Massillon, O., at \$23 per ton and 2 3/4 c. per lb. for specials.

Hawthorne, N. J.—To R. D. Wood & Co., of Philadelphia, for 2,143 tons of pipe, in size from 6-in. to 14-in.

Troy, N. Y.—To U. S. Cast Iron Pipe & Foundry Co., New York City, contract for 503 tons of 16-in. pipe at \$20.20.

East Liverpool, Ohio.—For construction of mechanical filtration plant to Chester & Fleming, Pittsburgh, Pa., at \$300,000.

Youngstown, O.—For furnishing corporation cocks to Glauber Brass Mfg. Co., Cleveland, O., at following bid: 12-in. at 32 cts. each; 5/8-in. at 41 cts.; 3/4-in. at 51 cts., and 1-in. at 75 cts. each; for curb boxes, to Farnam Brass Works, Cleveland, O., at following bid: 4-in. at \$2.40 each; 5/8-in. at \$2.50 each; 3/4-in. at \$2.75, and 1-in. at \$3.35. For valve boxes, to Moran Mfg. Co., New York, at \$2.90 each. H. C. Fox is secretary department of public service.

Cordell, Okla.—Contract for construction of water works extensions was awarded Feb. 9 to Humrichouse Construction Co. at \$64,150.95. Other bidders were as follows: Municipal Engineering & Construction Co., \$70,713; Sherman Machine & Iron Works, \$71,677.10; Tonkawa Construction Co., \$75,577.50; Hope Engineering Co., \$77,763; Chas. H. Shaw, \$79,302.60; Connor Construction Co., \$79,841.50; F. W. Keeney & Co., \$80,643; H. A. Kenner & Co., \$83,230; L. F. Lee, \$84,240.32; J. S. Terry Construction Co., \$90,215, and Creager, Little & Crawford, \$97,615.35. The Benham Engineering Co., Oklahoma City, Okla., are consulting engineers, and will have charge of the supervision of the work.

Terrell, Tex.—I. C. Sherwood of this city has been awarded contract to construct large reservoir in Ward county, cost of which amounts to \$476,000. Reservoir will impound water enough to irrigate 20,000 acres of fertile land.

West Vancouver, B. C.—To Vancouver Plumbing & Heating Co., Dominion Bldg., Vancouver, for constructing Sisters Creek water supply system, at \$98,612.

LIGHTING AND POWER

Bay Minette, Ala.—See "Sewerage."

Lapeer, Mich.—Boulevard lighting system is being discussed for Neponset St.

Phoenix, Ariz.—Plans are being considered for installation of ornamental lighting system in State Capitol Grounds. Plans call for 16 standards.

Pasadena, Cal.—Specifications have been adopted for construction and installation of ornamental iron and copper lighting posts and appurtenances on

South Fair Oaks Ave. from Dayton St. to California St. Posts are to be of pressed steel and copper shafts with cast iron capitals and bases, and each post will be equipped with a novalux ornamental unit for 400-candle power, nitrogen-filled lamp.

Fort Wayne, Ind.—Board of Works will soon ask for bids for 800-HP. high-pressure boiler to replace two 300-HP. units now in service.

Topeka, Kan.—Petitions are being circulated in North Topeka to make it possible for people of Topeka to vote bonds at coming election for municipal ownership of city electric light plant.

Corbin, Ky.—At meeting of City Council \$5,000 worth of electric light 6 per cent. 10-year bonds were sold to Weil, Roth & Co., of Cincinnati, at their bid of \$5,210 and accrued interest to date of delivery.

Baltimore, Md.—Superintendent of lamps and lighting is considering plans for installation of 50 additional lamps on Carey St., between Pratt St. and North Ave.

Wilbraham, Mass.—It has been voted to extend electric light from Springfield St. to Ludlow.

Lapeer, Mich.—Taxpayers are in favor of boulevard lighting system.

Saginaw, Mich.—On Feb. 17 election will be held for voting on \$500,000 bond issue for lighting plant.

Islip, L. I., N. Y.—Resident taxpayers of Central Islip have sent petition to town board asking for establishment of lighting district boundaries of which will be practically same as present school district. Petition calls for the installation of forty-seven lights.

La Grange, N. C.—Town will shortly issue \$50,000 bonds for electric lighting and water works plants.

Wilmington, N. C.—City Attorney E. K. Bryan, at request of Councilman T. W. Wood, has drafted a bill to be presented to General Assembly for enactment into law, to allow people of city to vote on question of municipally owned electric light and power plant. Bill provides for submitting question to people at regular municipal election in May, and also carries provisions for bond issue for \$100,000 to be used in acquiring and operating such a plant.

Wilson, N. C.—See "Water Supply."

East Palestine, Ohio.—Board of Trustees of Public Affairs will purchase new equipment for municipal electric-light plant. It is said that the output is to be practically doubled. W. H. Van Fossen is Mgr., Supt. and Cont. Agt. of the plant.

Hamilton, O.—Proposition has been received from West Side Commercial Association for installation of cluster lighting system on Main St. Association proposed to pay for cost of installation, estimated at \$1,658.15, provided the city would agree to maintain and furnish current for the lights after they were installed. Service Director Meyers figures the total cost of maintenance a year would be \$525.

Lorain, Ohio.—City Council will hold special election for voting question of establishing municipal electric-light plant. George N. Damon is City Clerk.

Toledo, O.—Petitions are being considered asking City Council to install ornamental lighting system in business district.

Haverford, Pa.—See "Miscellaneous."

Wilkes-Barre, Pa.—Resolution has been adopted authorizing bureau of parks to advertise for bids for lighting parks of city during coming summer.

Wheeling, W. Va.—Electric lights will be installed over entire town.

Salem, O.—City Council will investigate proposition to install municipal lighting system.

Price, Utah.—At regular meeting of city council it was decided to put question of leasing municipal light plant to private parties up to vote of people, and special election has been called for March 6. A bond issue amounting to \$10,000 will also be voted on at same time.

Salt Lake City, Utah.—At meeting of executive committee of upper Main St. merchants and property owners it was decided to proceed immediately with betterment of appearances of that section of business district, and petition was filed with city commission asking permission to erect additional light standards and to string festoons of lights across the street. Streets that are to form the "great white way" are Main, from First South to North Temple; State, from South Temple to First South; West Temple, from South Temple to First South, and First South, from State to West Temple.

CONTRACTS AWARDED.

Newark, N. J.—By Public Service Electric Co. for construction of its power plant on Passaic River at Point-no-Point to Becker Construction Co., Newark, at about \$270,000.

Marion, O.—Ordinance has been adopted authorizing director of public service to enter into contract with Eli M. West, as receiver of Marion Railway, Light & Power Co., to light and maintain 18 5-cluster lights on Main St., between Mill St. and first alley south of Church St., and two on Church St., between State St. and High St. Posts are to be installed by property owners of streets. Contract is for a period of five years.

FIRE EQUIPMENT

Suffield, Conn.—Purchase of new fire apparatus is being discussed.

Richmond, Ind.—Board of public works will recommend to council authorization of loan of \$12,500 for purchase of motor aerial truck. E. E. Miller is chief.

Covington Ky.—Covington City Commissioners have received petition from 40 citizens of Lewisburg asking that new fire house be located on Lexington Pike, between Hermes and Western Aves. Petition was referred to committee of whole. Commissioners have plans for new fire house drawn by Building Inspector Dailey, but location has not been definitely decided. It will cost \$10,000.

Fall River, Mass.—Following appropriations are being considered: \$15,000 for motor apparatus, \$2,500 for hose and 60 for alarm equipment. W. C. Davol is chief.

Greenfield, Mass.—Purchase of additional motor combination truck is being planned.

Needham, Mass.—Citizens will vote on proposition of issuing bonds in sum of \$5,500 for purchase of motor apparatus. H. H. Upham is Chief.

West Springfield, Mass.—On February 15 town will vote on purchase of combination hose and hook and ladder auto truck, and on making appropriation for same.

Cloquet, Minn.—City council has decided to have special election March 8 to learn people's wishes upon proposition of issuing \$12,000 in bonds to build new fire hall.

Little Falls, Minn.—The Firemen's Relief Association has decided to buy city a fire truck, provided the city would accept the offer. The truck is to cost not more than \$5,500.

Burlington, N. J.—The Hope Fire Company has ordered combination automobile chemical from the Roe Mfg. Co., of Downingtown, Pa.

Elizabeth, N. J.—Motorizing of Truck No. 1 and Truck No. 2 is recommended.

Long Branch, N. J.—Ordinance is being considered for erection of new fire house.

Brooklyn, N. Y.—Fire Commissioner Robert Adamson has requested board of estimate for appropriation of \$991,497.81 for new fire alarm system for Brooklyn, Manhattan and Bronx. Request is on calendar for next meeting of board when it will be referred to committee on corporate stock budget. Entire cost of the installation of new system is estimated at about \$5,000,000 and above named amount now asked is estimated by fire commissioner as minimum sum necessary to start work replacing present antiquated system condemned ten years ago.

Building at Malbone St. in Prospect Park district, which will be central alarm station for Brooklyn, is completed but no apparatus can be installed until appropriation is granted.

Buffalo, N. Y.—Fire Board is planning to purchase six tractors, two engines, one ladder truck, one combination chemical and hose car, and seven chiefs' cars during current year. Estimated cost \$75,000. B. F. McConnell is Chief.

Cortland, N. Y.—Resolution has been passed to ask for sealed bids on fire alarm signaling apparatus, bids to be received 8 p. m., Feb. 23. J. R. French is city clerk.

Fredonia, N. Y.—Village Trustees on March 8 will vote on purchase of automobile fire truck.

Le Roy, N. Y.—Chief F. H. Rogers has recommended purchase of combination chemical and hose wagon, capable of carrying 1,000 ft. of hose. Estimated cost \$1,500.

Middletown, N. Y.—New Equipment for Ontario Hose Company is being considered.

Schenectady, N. Y.—Comptroller James F. Hooker has advertised the sale of \$12,500 fire bonds on Feb. 16 at 11 a. m.

Southampton, L. I., N. Y.—Purchase of more fire hose is recommended.

White Plains, N. Y.—Architect Frank Horton Brown has been engaged to draw plans for new East Side Hose Co. house which will be erected at corner of Warren St. and Terrace Ave. on site of present wooden building. Plans will be ready soon and then Board of Trustees will be requested to arrange the \$15,000 bond issue approved by taxpayers at last village election.

Cincinnati, O.—Ordinance has been passed providing for issue of bonds in sum of \$50,000 for purpose of providing funds to pay cost of improving, repairing and securing more complete enjoyment of the buildings necessary for fire department, and equipping and furnishing same and paying the cost of placing underground wires and other signal apparatus of fire department.

Marion, O.—Ordinance has been adopted to provide for issue of bonds in sum of \$2,200 to equip Mark St. fire station.

Williamsport, Pa.—Petition has been presented from Citizens' Hose Co. No. 2, asking that modern motor driven chemical be purchased by Council and placed in Hose House No. 2. Petition was ordered placed on file.

Woonsocket, R. I.—Committee on finance and fire department has recommended appropriation of \$2,700 for purchase of auto fire wagon. Recommendation has been adopted.

Waukesha, Wis.—Ordinance authorizing bond issue of \$4,000 for motor combination chemical and hose car is being discussed. P. Wild is chief.

CONTRACTS AWARDED.

Watervliet, N. Y.—Following contracts for 1,500 ft. of hose have been awarded: To James Hamil Co., 500 ft.; Gutta Percha & Rubber Co., New York City, 400 ft., at \$1.05; Eureka Fire Hose Co., New York City, 300 ft., 90c.; Fabric Fire Hose Co., New York City, 300 ft., 90c.

New Bern, N. C.—For furnishing a triple combination motor pumper following bids were received: Seagrave Co., Columbus, O., \$9,000; Jas. Boyd & Bro., Inc., Philadelphia, Pa., \$9,500; American-La France Fire Engine Co., Elmira, N. Y., \$9,000. Contract has been awarded to American-La France Fire Engine Co.

Chester, Pa.—To International Motor Co. (Mack truck), New York City, for chassis for chemical wagon.

New Castle, Pa.—Following bids have been opened for furnishing 1,150 ft. hose: Smith, Hutton & Kirk, New Castle, Pa., 90 cts. to \$1.10; Quaker City Rubber Co., Philadelphia, Pa., 90 cts.; Bi-Lateral Fire Hose Co., Columbus, O., office, 80 cts. to \$1; Eureka Fire Hose Co., New York City, 90 cts. to \$1.10; Dickson & Co., New Castle, Pa., 70 cts. to 80 cts.; New Castle Hardware Co., New Castle, Pa., 65 cts. to 93 cts.; Voorhees Rubber Co., Jersey City, N. J., 80 cts. to \$1; C. Ed Smith, New Castle, Pa., 80 cts. to \$1; Gutta Percha & Rubber Mfg. Co., New York City, 61 cts. to \$1.05. Contracts for 350 ft. each have been awarded to Dickson & Co., Smith, Hutton & Kirk Co., and the New Castle Hardware Co.

Sharon, Pa.—To Driggs-Seabury Corp., Sharon, Pa., for combination chemical and hose car, at \$3,226.50.

Tacoma, Wash.—City council has awarded contract for new combination patrol and ambulance wagon to Winton Motor Car Co. for \$3,100 cash. Company took in old patrol for \$980 and deducted \$700 from its original bid of \$4,700 for city's permission to have new body for patrol made in Tacoma.

BRIDGES

Oakland, Cal.—To accommodate the 40,000 commuters who daily cross to San Francisco from this side of bay and at night return to Oakland, Alameda and Berkeley, State Board of Harbor Commissioners has prepared plans for construction of a \$200,000 steel frame and concrete bridge and walk.

Santa Ana, Cal.—February 16 has been set as date for receiving bids for building concrete bridge across Oso Creek below El Toro, on state highway.

Indianapolis, Ind.—County council will hold special session for purpose of making additional appropriations for 1915. More than \$100,000 is asked in appropriations for new bridges.

Leavenworth, Kan.—Ordinance has been passed authorizing and directing submission to voters of City of Leavenworth, question of issuing bonds for construction of bridges over Three Mile

Creek. Bonds are in sum of \$31,053. F. Metchan is City Clerk.

Lake Charles, La.—Police jury has practically committed itself to re-inforced concrete bridge over river below city by contracting for designs and patent rights to a Bascule lift. Plans for bascule lift will be secured from Strauss Bascule Bridge company of Chicago, the police jury to pay \$1,600 and royalties.

Williamstown, Mass.—Three new bridges have been voted, one for New Ashford Rd., one for Hopper Rd., and one for Hancock Rd., and it was voted to continue construction of new road jointly with Massachusetts highway commission on through route to Pittsfield.

Walkill, N. Y.—The proposition of building bridge across river here at cost not to exceed \$30,000, will be put before taxpayers shortly. Structure has been condemned by state.

Hamilton, O.—It has been decided to advertise for bids for rebuilding of Columbia bridge at cost of from \$60,000 to \$80,000, according to material to be used, steel, iron or concrete.

Lima, O.—Ordinance has been passed determining to proceed with improvement of permanent reconstruction and construction of bridge approaches thereto, and all necessary work incident thereto, across Ottawa River, at its intersection with Pine St.

Toledo, O.—Bids will be received at office of City Auditor, Toledo, O., until 12:00 M., Monday, March 8, 1915, for purchase of \$45,000 City of Toledo four and one-half per cent. Fasset St. Bridge Bonds. Amos McDonnell is City Auditor.

Toledo, O.—Notice is given that board of county commissioners of Lucas county, Ohio, will sell to highest responsible bidder ninety-seven thousand six hundred and seventy-four and 42-100, (\$97,674.42) dollars of said county's bonds, at its office in Toledo, Lucas county, Ohio, on the 19th day of February, 1915, and sealed bids will be received by county auditor up to 10 o'clock A. M. of said date. Bonds are issued to provide a fund for purpose of constructing and keeping in repair necessary bridges and approaches or ways thereto throughout county. Chas. J. Sangenbacker is Auditor.

Harrisburg, Pa.—Water Supply Commission has just issued permits for nine bridges, one culvert and one fill. Permits were issued to Greene County to build a bridge over Whitley Creek, at Morris bridge; Huntingdon County, to build a bridge over James Creek run, 1,500 ft. from Braumaugh's crossing, Pennsylvania R. Co., to build bridge over Dick's run, 6,591 ft. southwest of centre of Unionville passenger station, Union Township, Centre County; Gettysburg & Harrisburg Railway Co., to build bridge over unnamed tributary of Opossum Creek, 1,400 ft. south of Guernsey, Butler Township, Adams County; Cambria Steel Co., to make fills along both banks of the Lancaster Creek, near Nagney quarry, Mifflin County.

Haverford, Pa.—See "Miscellaneous."

Philadelphia, Pa.—Bids for a \$350,000 bridge which will be an important factor in work of eliminating grade crossings in South Philadelphia, have been opened by Director Cooke, of department of public works. Bridge is to carry southern boulevard over the belt line, six track, right of way just north of gate to navy yard.

Dallas, Tex.—County Engineer J. F. Witt has been instructed by Commissioners' Court to take steps looking to early repair of damage done to Oak Cliff viaduct by swelling of wood blocks during December rains.

Ogden, Utah.—Architect Leslie Hodgson, who drew plans for viaduct which is to connect new building of John Scowcroft & Sons Co. with old one, has announced that bids for structural steel are now being received and will be opened next Thursday. Viaduct is to be 113 ft. long, 11 ft. wide and will have covered passageway. It will be supported by four pillars, none of which will be in roadway, and will be capable of sustaining stationary load of 200,000 lbs. or a moving load of 100,000 lbs.

CONTRACTS AWARDED.

Laporte, Ind.—Following bridge contracts have been let at meeting of the county commissioners: William B. Hutchinson secured the contract for the Ham Hofer bridge in Kankakee township, at \$12,450. The A. C. Johnson bridge in New Durham township went to Louis Martine on his bid of \$23,000. C. D. Andreas, of Pierceton, Kosciusko county, secured the contract for building the Swanson bridge between St. Joseph and LaPorte counties, at \$995. Andreas also

obtained the contract for repairs to the Frame bridge between LaPorte and Porter counties, his bid being \$775.

Corning, Ia.—Bids have been opened by county board of supervisors for bridge supplies and materials to last during the year 1915. All bids for corrugated pipe, cast iron and boiler iron pipe were rejected. The awards were made as follows: W. D. Jarman, Nodaway, furnishes 100 bbls. of cement at that station for \$1.40 per bbl. The Dixon Lumber Co. furnishes 200 bbls. of cement at Corning for \$1.40 per bbl. The Wilson Concrete Co., Red Oak, secured the contract for 18 tons of reinforced steel at \$1.64 per 100 lbs.; also for 24-in. pipe at \$1.67 per ft., 30-in. pipe at \$1.90, 36-in. pipe at \$2.24, 42-in. pipe at \$2.85. The Coon River Sand Co. of Des Moines is to furnish sand at 25 cts. a ton; gravel, 1/4 to 3/4-in., at 90 cts. a ton; 3/4 to 1 1/2-ins. at 75 cts. per ton; concrete mixture, 60 per cent. gravel, at 55 cts. per ton. To these prices are to be added the current freight rates, which now are 73 1/2 cts.

Logan, Ia.—Bids for bridge building material have been opened at office of J. M. Albertson, auditor, and contracts awarded as follows: Cast iron pipe, American Casting Co., \$1,085; corrugated metal pipe, Lana Construction Co., \$4,938; Wilson Concrete Co., for culvert material, \$1,159; the Clinton Bridge Co. was given contract for furnishing reinforcement bars to amount of \$652, and local company contract for cement.

Salina, Kan.—Contract for construction of new concrete bridge over Smoky Hill probably will be let to the Concrete Construction company of Kansas City for bridge with a 47-foot driveway. Bid of Concrete Construction company of \$26,200 on original plan for a bridge with a 47-foot driveway was lowest submitted.

Canajoharie, N. Y.—The Groton Bridge Co., of Groton was successful bidder for erection of 50-ft. clear span, with 20-ft. roadway to be placed one mile north of Ames on the Canajoharie-Sharon highway, for nominal sum of \$1,634, town to erect abutments ready for bridge.

Mannington Hill, Pa.—By Board of Freeholders for erection of iron bridge over Salem creek to Henry B. Richman, of Woodstown, at \$2,354.

Chehalis, Wash.—Lewis County Commissioners have awarded contract for building of steel bridge of 110 ft. span across Newaukum River, six miles east of Chehalis; also for a 130 ft. span across the same stream on road leading from this city to Napavine, to Coast Bridge Co. of Portland, price being \$9,427. C. J. Huber was awarded contract to move bridge at present standing near Phillips Place to new site on south fork of the Newaukum River.

MISCELLANEOUS

San Francisco, Cal.—Board of State Harbor Commissioners has approved plans and specifications submitted by Chief Engineer Jerome Newman for construction of concrete pile foundation for proposed viaduct for pedestrians at the north side of Ferry building.

La Junta, Col.—The city council has passed on first reading of ordinance authorizing electors to vote on the \$75,000 bond issue at spring election.

Washington, D. C.—See "Streets and Roads."

St. Augustine, Fla.—Bids for the construction of pier in Bayboro harbor have been called for by City Commissioners.

Hartford City, Ind.—Bonds amounting to \$32,000 have been sold to Campbell & Sons, of Indianapolis, for \$33,446.

Wabash, Ind.—The Indiana Trust Co. of Indianapolis has purchased a \$20,000 bond issue authorized by city of Wabash to meet current expenses.

Fall River, Mass.—Bids will be called for at once for new police station.

Taunton, Mass.—Committee on streets and bridges are considering the proposals for stone crusher plant, appropriation for which was made by municipal council. As there are one or two details in connection with contract, that committee want to look into further final action was delayed.

St. Paul, Minn.—St. Paul will sell \$1,227,000 in bonds within next few weeks. Bids will be called for on basis of 4 1/2 per cent. These are the prospective bond issues: Refunding, \$677,000; water, \$150,000; improvements, \$400,000; total, \$1,227,000.

Camden, N. J.—Camden County Asylum 20-year 4 1/2 per cent. improvement bonds have been sold to Riley, Brock & Co., of Philadelphia, by Board of Freeholders. Bid was \$51,559.50, a little over 3 per cent. premium.